

To be launched with a bang

FOREIGNERS, particularly Americans, really are poor sports, aren't they. Nasty people in the US semiconductor industry, sulking at us trying to join their game, are circulating malicious rumours about the name that they claim is going to be given to Immos's first product. Since it will be designed and manufactured in two different countries, they say it is going to be called Concorde — the world's noisiest and most expensive 64K RAM. They're just sore because we've got a two-year tail start on them.

Talking about names for things, why do you suppose it is that IBM always insists on calling things something completely different from what everyone else calls them? Or using the same names to mean different things?

What everyone else calls "distributed computing", IBM calls "cooperative network

systems". To non-Blue people, "personal computing" means a computer that sits on your desk or bedroom table; to IBMers it means something using vast mainframes. One of the latest announcements, the 3730, IBM says can work as a "stand-alone word processor", whereas what they mean is "shared-logic word processor".

What the rest of the world calls a minicomputer, IBM calls — what does it call? On looking through the bumph, I get the feeling it avoids the issue, like upper-class English people with no name for the last course of a meal.

I would be the last to claim to understand what goes on inside Big Blue's vast inscrutable corporate mentality, but I suspect it has something to do with the use of language to conceal thought, a devious practice with a long and distinguished pedigree.

Unilluminating addresses

I AM told that all-purpose recognition equipment is still a long way from being practical, if it ever will be, but I suspect some people in the States are forging ahead with using it, following the principle of Admiral Farragut who said, "Damn the torpedoes. Full steam ahead!"

Recently RTE, the Irish television service, received from the US a book addressed to "Rev Slyberry". Nobody in the Religious Department had ever heard of such a clergyman. There was much puzzling over this, until someone rang

up the Reference Library and asked if they knew anything of the reverend gentleman, and then the penny dropped with an almighty clang!

Of course, it may not have been a machine that did this at all, but a slow-witted secretary on the end of a dictaphone. Human beings make mistakes too, you know.

It would be hard to beat the circular received by the office of the Better Business Bureau in a Midwest American town. It was addressed to "Ms Betty B. Bureau".

Getting in on the act

THE Family Planning Clinic in Sandwell, Cheshire, is apparently acquiring a Mickie the patient interviewing system devised at the National Physical Laboratory. The Sandwell Evening Mail, attempting to explain this, informs its readers: "The typewriter-sized computer acts as a visual

aid for patients with sexual problems."

Wow! Talk about multi-function hardware. I know Chris Evans at the NPL has a reputation for unconventionality, but I didn't know his machines actually demonstrated this sort of thing!

The "convergence of technologies" is a phrase which buzzes close to any discussion on information technology; and it is a phrase that could carry a nasty sting in its tail for any DP manager who fails to heed its message.

DP managers who regard the moves towards corporate integrated information services as an intellectual exercise in hypothetical speculation could be facing a nasty day of reckoning as they become boxed into a career path that has nowhere to go. Ron Yearsley, a director of BIS Applied

Systems, has had considerable experience in observing at close quarters the impact on DP management careers of the convergence of DP, telecommunications and micro technologies. In this interview with Malcolm Peltz, Yearsley warns DP managers that they should take stock of their future quickly and initiate positive and urgent steps to ensure that they use the changes introduced by information technology to enhance their status rather than being overtaken by the office manager or administrator in the race to the top of the information management tree.



Are DPMs going the way of the dinosaur?

LIKE the dinosaur failing to keep up with evolution, DP managers could face extinction unless they take the initiative in establishing themselves as a controlling influence in the changing field of corporate information.

That is the analogy Ron Yearsley, a director of BIS Applied Systems, uses to encapsulate the challenge being posed to the DPM by the convergence of information technologies into an integrated information service that will encompass the areas currently the concern of separate departments and managers — office services, the mail room, telecommunications and the traditional DP department.

"Dinosaurs grew to be very big but they developed some communications problems between their brains and their tail," Yearsley said, drawing a comparison with large DP departments which are becoming out of touch with what is happening around the fringe of their area control.

"So when sabre tooth tigers started biting their victims' tails, it took a long time for the message to reach the dinosaur's brain and for the beast to react."

"Failure to adapt to a new environment led to the extinction of the dinosaur and I would recommend Charles Darwin's *Origin of the Species* as a salutary text for any DP manager to read as a warning to what can happen to those who fail to change their old ways to meet new trends," stressed Yearsley.

The key challenge to the survival of the DP manager as a thriving species, according to Yearsley, lies in the question of who gets the function that will be created in many organisations of "controller of administration" or "information services controller".

This function will be far wider than the management services function which has been the

pinnacle of the DP management ladder so far.

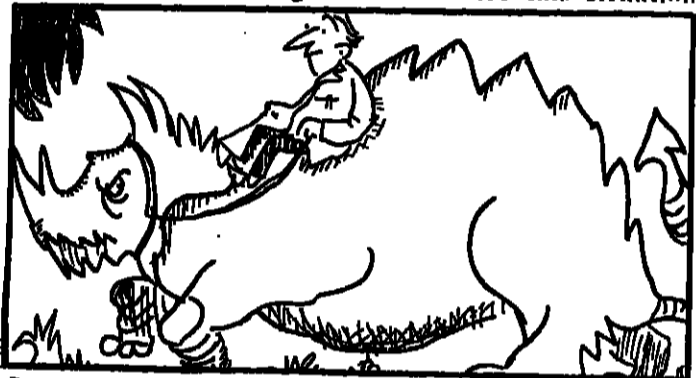
Yearsley said he had already been involved in one organisation which has established the position of administration controller with responsibility for DP, office administration and telecommunications.

"This top job did not go to the DP manager but someone with experience on the office and administration side. Yearsley believes that, unless DP managers

simile) services.

"When the senior executives in a company begin to realise that it needs a top man to co-ordinate and control all these services, the DP manager could be left behind, because he is viewed as too much of a technician who does not understand the wider problems of the organisation and the needs of the end users of the systems."

The DP manager has often got himself into this situation,



take the initiative soon, this kind of failure to progress in the company hierarchy will continue.

"I meet so many people in DP management with the attitude that they have reached the top and have done everything there was to be done in their own field," he commented. "They feel they've climbed Everest and seen it all before. Yet at the edges of their areas of direct control, revolutions are going on."

"The word processing market, for example, is growing like crazy and the companies marketing office systems are in there selling, selling, selling. And they are aiming their sales 'stack mainly at the office manager, not the DP manager." Yearsley pointed out that there is a growing use of telephone switching systems, like the IBM 3750, which are bringing closer the integration of voice, data and picture (fac-

company management must be convinced that distributed processing can only work effectively if it is centrally planned and co-ordinated."

The DPM, Yearsley said, must become the progenitor of ideas. He must establish a relationship with the whole company, so that there is a feeling that the DP department is the place to go to receive advice and assistance on any aspect of information technology.

Yearsley mentioned the case of one DP manager working for a large group who one day found himself faced with a corporate decision that the DP department was to become a profit centre and that all the other operating divisions in the group had been given the freedom to choose whether they used his department or some outside DP service.

At first, Yearsley said, the DPM was worried because he realised he had to sell his services rather than sitting back and waiting for the compulsory users to roll in.

This gave him the impetus to get out and talk to users to find out what they wanted. And what they wanted initially was a mini to call their own; something on which they could do their own local work.

He realised eventually that the user divisions did not really care what type of systems they had — the "mini" fans were only hooked on the latest buzz-phrase. So he made a deal with a manufacturer of small business systems to buy in bulk, thereby making a cost saving; he installed a small business system in each operating division while still keeping his own mainframe department going.

As a result of this, the DP manager was seen to be the friend of the user, because he was giving them the services they wanted, and he raised his status in the eyes of his own managers because he was seen to be an effective implementer of systems that added to the effectiveness of the corporate operations.

"This is an example of the best in DP management, with the DP department acting as the agent for change."

Given the problems of rapid technological change — increasingly demanding users, the lack of skilled staff, etc — what advice would Yearsley give a DP manager who has seen "the writing on the wall" and wishes to avoid the fate of the dinosaur and the dodo?

"Make sure you delegate properly," is his main advice. "Delegate the operations to the computer services manager and the development to the systems manager. Make time for yourself to talk to users, to look at new developments."

The DP manager is in danger of sitting back in a comfortable technical niche, while the tide of micros and word processors rises all around him.

On the other hand, the DP manager can carve out a career path full of power and glory and riches. But it will take courage and effort to do this and time is running out. The future has already begun.

Selling to the unions

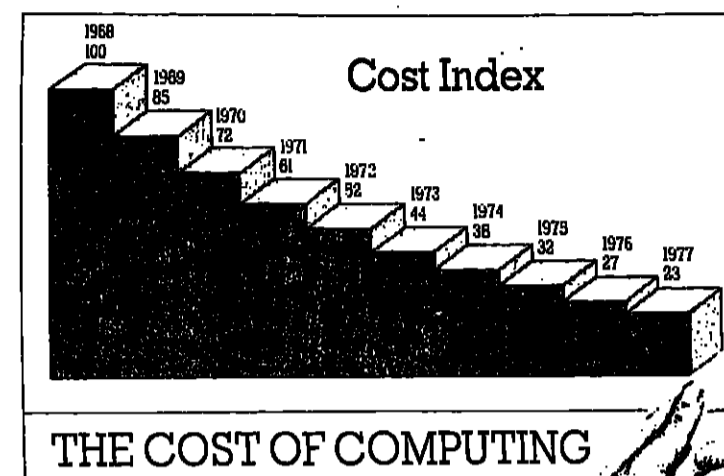
TRADE unions will play an increasingly important role in the running of DP departments and DP managers will have to become more skilled in employee and industrial relations, according to Ron Yearsley.

"Whether DP managers like it or not, more and more of their time is likely to be spent dealing with trade unions acting, both for their own staff and for users' staff."

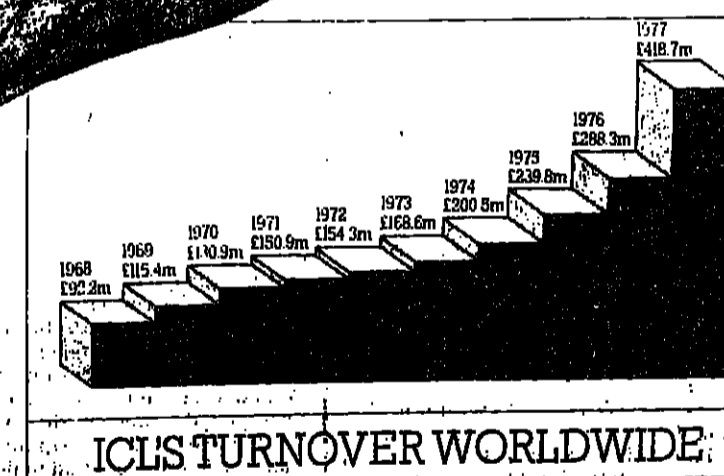
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GILB'S MYTHODOLOGY

Record level hash totals as a safety belt



THIS column introduces a fairly narrow idea, but then safety belts are narrow and they can still save lives.

The basic idea is simply that logical application records, such as those at the 01 Cobol level, must also contain a checksum which is usually a word of storage which is the binary sum of all other words in the record.

The checksum is recalculated whenever the record is updated and is available for re-checking at any time we want to verify the integrity of the record, in particular before any new update.

One of the few places I have seen this technique recently is in IBM's floppy disc control field specification. But it is absent from almost all texts on database and file design.

Even Gio Wiederhold's book "Database Design" (McGraw Hill, 1977, 858 pp) does not mention it directly as far as I can see and only hints at a core buffer checksum.

The first time I saw it applied was in 1965 by IBM's software distribution centre in Paris, for the protection of records, which were operating systems in an 80 character format on tape.

After weeks of frustration in trying to generate operating systems from tapes which had

some sort of fault, one which was not detectable by parity checks, or any conventional check, IBM discovered that there was an 81st column on tape records and generated a record level hash total for each record.

When we got the tapes from Paris, we could immediately detect the presence of faulty records, and since we knew the exact record we could often get a Telex correction. Previously we only knew something was wrong and a new tape was dispatched from Paris.

This was dramatic in practice and from then on I became aware that there were a large number of file integrity situations which would benefit from the technique.

Certainly today, I make it an early design specification in any file where reliability control is important and that covers almost all files.

Yet, to this day, neither IBM nor other manufacturers (please correct me if I'm wrong) teach this technique, or write about it, or even include it as an option in database management software, floppy discs excepted.

One reason why many people mentally discarded the technique was the cost of space and computation time for it, as opposed to their

reliability requirements. The economics have changed dramatically and the use of secondary storage space and CPU cycles to protect centralised online database records seems like a much better trade-off now.

When you recognise that the conventional re-reading of disc records can be dropped, when you use RLHT, there is an even more immediate and tempting trade-off.

You cannot attempt immediate re-writes when you later detect an error but, on the other hand, you get error detection protection for the life of the record which is far more valuable than simple verification that the record seems to be OK the instant it was written.

In particular you get protection from software errors, both in your programs and the supplier software. There are already thousands of known bugs present in any large operating system in case you didn't know.

I can't go any deeper here but the idea is out in front of you. It is your responsibility to integrate this technique into your data protection design. It says so in IBM's software contracts and user manuals too.

I hope you will ask, as many of my students do: "Why didn't we learn about this long ago?"

Information Studies goes into Orbit

Information Studies thanks IBM for the timely announcement of Orbit and the Distributed Office Communications System.

Participants at "Communicating with IBM" on 7-8 November in London will hear the first European comments and assessment of these announcements, by Phil Dorn of New York, leading communications consultants David Hebditch and Fred Lamond, Saroj Kar'of Telecom Computer Technology USA and Dale Kutnick, The Yankee Group, USA.



Brochure and further details from:

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PROGRAMMER NOTES

Micros challenge older techniques

TO anyone contemplating a change in career from working with mainframes to working with micros, the following notes may give more information on which to base a decision and, to anyone who has recently made the change, they may be instrumental in providing a shortcut to acquiring the relevant skills.

The main areas where it is likely that some education will be required are operating systems and their functions; and file access techniques.

Working on mainframes it is easy to forget how much the machine's operating system does for one, particularly when working in high level languages, which must surely be the highest probability for application programmers and analysts.

The kind of routines which may have to be developed include logical record input and output; memory initialisation; screen manipulations such as clears, roll-up, display in sections etc; data entry; buffering and unbuffering of packed data; print editing; and general error interception and recovery routines.

It is worth spending a lot of time to get these routines written efficiently, both in terms of operating speed and storage requirement, as the effort will be repaid in subsequent speed of application program development.

The second area which one tends to take for granted, working on mainframes, is file access techniques.

The three specific techniques worth studying are direct access, index sequential access and transaction chaining. If you are lucky, the micro you choose to work with will have some kind of index sequential access package, but even if it does it is quite likely that it will not be sufficient to cover all needs, and as far as the other two techniques mentioned are concerned you will probably have to work from first principles.

The lack of sophisticated operating system and file access aids has a major impact on system design, as have the two other shortcomings of micros compared to mainframes. That is: low volume, backup storage and low speed printing. There follows a list of design parameters which are particularly applicable to micro-based systems, although some of them can equally be said to apply to mainframe systems.

Transaction files should be designed for multiple use, eg. the same file should be used to update the sales ledger, to print the sales day book, to update the nominal ledger and to update the sales history and statistics.

Simultaneous updating and printing should be avoided if at all possible. Spooling of printout is unlikely to be practicable, and

to have to re-run jobs from backup discs to get multiple copies of a report can be difficult and time-consuming.

Control techniques should be developed to bring to the attention of the user the fact that data files are reading capacity, while he still has the opportunity to deal with the problem within the normal system.

Queues of batch jobs should be kept to a minimum. Untrained operators, which is what intercepted and made clear to the user. This not only allows the user to overcome the problem in many instances, but also makes life easier for the backup team in more serious cases.

Security backups should be an integral part of the system, otherwise recovery can become impossible, or at least extremely lengthy.

Modular techniques should be used whenever possible so that the same piece of coding, modified if necessary, can be used many times and not re-coded. This saves not only main memory space but object code space on the limited backup storage medium.

A library of standard macros should be developed and used whenever possible, unless a program has a high data-entry content, in which case speed of operation overrides speed of program development and own coding should be considered.

The sequence of operations in programs which have to be re-storable is highly critical. That is: control counts of records read and written, and position of input record last updated should be all updated at the end of the sequence of operations, simultaneously if possible.

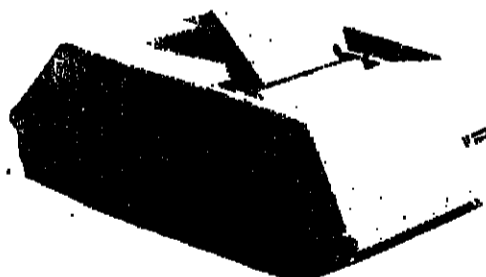
If program overlays are necessary they should be executed when there is a natural break in the sequence of input.

In summary it is true to say that the difference between mainframes and micros is one of width of technique. One tends to have to do more to achieve the same result, but to have to do it efficiently to avoid using up the capacity of the machine or the patience of the user.

System errors should be in-

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Puzzler

MOST people know that three weighings on a two-pan balance, will suffice to identify one faulty coin in a batch of 12, the maximum possible number — given that the odd-coin-out is either lighter or heavier than the others.

Now, if the faulty coin is known to be lighter, then naturally a greater number of coins can be catered for in the analysis. This week's problem is to find just how large the batch can be in this case, and to formulate a suitable method for identification.

See page 53 for solution.

SOFTWARE FILE

Structured programming is being increasingly used by the more progressive programming shops, but too many systems designers still rely largely on traditional rules of thumb.

As a contribution to increasing awareness of the needs to improve system design techniques, Computer Weekly is starting next week a 10-part tutorial series on structured file and database design written by Max Stewart, divisional technical support manager of Leyland vehicles. While technical manager for Leyland's Scottish central region, Stewart installed the

operating software for one of the UK's first IBM 3802 SNA distributed database systems. In the series, Stewart will explain the underlying concepts of one of the most significant developments in database design, the relational database.

As a preview to the series and to place the significance of relational databases in terms of the real world of IBM marketing and product announcements, this week Stewart takes a peek into the future and predicts the likely impact of relational database systems on IBM's hardware and software in the 80s.

How IBM database systems might look in the 1980s

"FORWARD into the 70s with IBM's virtual storage systems". This, as many readers will remember, was the general tenor of IBM's publicity when OS/VS and DOS/VS were announced in a blaze of sententious glory. Accepting the limitations of 1960s-vintage hardware, "human wave" programming teams (large was beautiful in those days) and a truly archaic job control language, they didn't turn out to be too bad after all. But IBM did not invent virtual storage; and our story could be repeated for many of IBM's less significant announcements.

The purpose behind this "dig" at IBM is to reinforce one point: it was not first off the line but ended up leading the market place by sheer bulk and muscle. But what of the consequences if IBM had been first in some major development?

We will shortly find out only too easily: the invention of relational database systems is arguably the most significant development this decade and IBM could with considerable justification claim a proprietary right to the concept.

The future of non-experimental relational database systems thus rests largely in IBM's lap and it is not inappropriate to make some predictions based upon present trends in IBM hardware and software development.

IBM will not produce a Codasyl set-structure database management system.

IBM will introduce a file handling (back end) functional processor within the next eighteen months. This processor will handle all IBM file structures (possibly emulating a 3350 series disc controller) but will have a native mode for handling Vsam files.

This native mode will allow some Vsam functions — index searching for example — to be off-loaded from the main processor.

There is a strong similarity with the way 370X TP controllers work: Vsam resides in the main processor; NCP resides in the 370X and takes on some of the work which an older access method such as Bnam performs in the main processor.

The back-end processor will have a large capacity bubble memory cache to reduce the access time for clustered retrievals; this again has a parallel in the dynamic address translation look-aside buffer of the current series of main processors.

Input/output channels will become microcode-driven sub-processors in their own right. They will be controlled in groups of six by a "functional processor" development of the existing 3030-series channel director.

This new intelligence will give channels a feature which has been sorely lacking — two way working — analogous to running a communications link at full instead of half-duplex.

For the H series of processors due within two years the MVS operating system will be extended to support IBM's System R relational database management system and its access language Sequel.

Many System R functions will be performed in the file processor,

and the Vsam index-searching mechanism will be extended to support generalised searching on content. The work involved in answering a query such as "RETRIEVE ALL EMPLOYEE NUMBERS WHERE (AGE > 65 AND SEX = MALE) OR (AGE < 65 AND SEX = FEMALE) AND LONG-SERVICE = YES" will be performed mainly in the file processor by searching the data content of records rather than by searching indexes.

System R will be offered with an IMS bridging aid similar to the Bant interface provided by Vsam but with extensive microcode assist. IMS users will thus be able to access a subset of a System R database. System R will also allow a System R (ie non-IMS) user program to access an IMS Vsam database. System R "tuples" will be accessed as IMS segments and vice versa. IMS itself will continue to be supported.

Although System R is essentially interactive and terminal based, it will provide a lower level access method to user programs similar to the ACB/RPL mechanism used by Vsam and Vnam. Programs will be able to execute some System R commands in their high-level form using an SVC or Diagnose interface similar to that available to VM/CMS programs.

The difference between files and databases will become blurred. From the user's point of view data will be stored and accessed as simple unstructured files. Users will be able to build hierarchies or Codasyl set-structures of files at will since the System R structure is more general than either.

Data will be defined in a Data Dictionary and the object form of a definition (similar in principle to the object form of an IMS DBD) will be produced automatically. Assist microcode will subsequently be announced to interpret high-level language data definitions dynamically (at run time).

Let us finally make one prediction to what even the purists' appetites. The unit of information flowing about in an SNA communications network is to the user, a request-response unit (RU).

The unit of information in a relational ("fourth normal form") file is a record ("tuple"). It is thus possible that IBM will define an overall database-to-data communications strategy with the FNS tuple and SNA RU as one and the same thing.

Analysing circular structures

SOFTWARE for civil engineering provided by bureau SIA has been augmented with Shells, a program for analysing circular structures.

The effects of wind, temperature, settling, earthquakes and such on chimneys, cooling towers, curved box girder bridges, and similar structures can be ascertained in general terms before more detailed studies are made.

SIA claims there are virtually no restrictions on the size of problem that can be run. The bureau operates a CDC Cyber 72 front-ending a CDC 8600.

Value on Dutch market

OPERATIONS software products developed by Value Computing are to be introduced on the Dutch market by its UK distributor RTZ Computer Services at an Amsterdam seminar on Value's Comput-A-Charge system. An enhancement to it will also be released.

Mystery surrounds DEC's Bliss-32 in UK

THE new Bliss-32 language for writing system software on the VAX minicomputer appears to be something of an unknown quantity, at least in the UK.

Digital Equipment Corp announced Bliss-32 for the VAX-11/780 32-bit minicomputer two weeks ago, along with several hardware enhancements (CW, October 5).

Bliss has been used by DEC for writing operating systems, compilers and handlers since the start of the decade. It has never been made available to customers in the UK before, although some US users have exerted sufficient pressure on the company to get access to it.

Now, however, it is formally available on the VAX and, in the US, it will be offered from January at a once-only licence fee of \$12,000. No UK price is available.

The language bears some similarity to Pascal, Coral and Algol, but is very specifically limited to writing system software, and DEC believes that

some OEMs may welcome it in the UK for writing things like RTL-2 compilers.

Few details of the language are yet available however and Arbat, the systems house which specialises in writing system and application software for banking and finance, while aware of the language, knew little about it.

DEC itself is firmly wedded to Bliss, despite some pressure from within the company to switch to the increasingly popular Bell Labs C language for writing system software.

Distillery contract

COMMERCIAL systems for a Honeywell Level 62 computer ordered by James Burrough Ltd are to be designed by Software Sciences. Management information, financial, order processing, and stock recording systems are the first applications required by the company, which distils Beefeater Gin and Borzoi Vodka.

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OP SPOT

OPERATIONS staff are often remarkably loyal to the operating system they have been brought up on. If you don't believe me, assemble a group of staff with different career backgrounds (in terms of the software they have used) and get them to compare notes. You can be sure that each will promote the merits of his particular system.

The problem with such discussions about operating systems is that certain barriers exist; some are conceptual in nature, but in the main they relate to the jargon and terminology peculiar to each system. Bearing this in mind I would like to discuss IBM OS, which is widely used on that manufacturer's 360 series and worthy of consideration both in itself

and as a forerunner to the OS/VS operating systems. Now, what follows is intended primarily for those who have little or no knowledge of the system and so I must ask IBM OS operators to bear with me. Although the system supports TP networks and usually works in conjunction with a spooling system, I am going to consider it in isolation.

Trying to gain a wider knowledge of systems

THERE are two types of OS: multiprogramming with a fixed number of tasks (OS/MFT), and multiprogramming with a variable number of tasks (OS/MVT). With the former, main storage is divided into fixed partitions (each of which supports one job at a time), while the latter has INITIATORS which allocate main storage (and other system resources) in accordance with each particular job's requirements. In this discussion I shall refer to OS/MVT. Let's start on the assumption that the system has already been loaded and trace a single batch job through the system. Now, at all stages the system will display messages relating to the needs of the job by means of a routing system. In addition to this, the System

Management File will be used by the system to record data concerning the resources the job uses. The first step for the operator is to start a READER, a WRITER and an INITIATOR. These are all procedures which live on disc and may be loaded into main storage by means of the START command. Next he must feed the job into the card reader, and after this OS takes control of the job. Firstly, the READER procedure takes the job and places it on one of the input queues. It informs the master console operator of this by sending him the appropriate message. Next, the INITIATOR allocates the system resources required by the job: the tape and disc drives and main storage, etc. Now, each time a tape or

disc volume is to be mounted, the operator in the area concerned will be sent a message by the system requesting that he carries out the function. At the end of the job, the INITIATOR will de-allocate resources, place any listings to be printed or punched on the output queues, and keep the system operator informed about this by sending him a series of messages. The WRITER will then take the output from the queues and transfer it to the appropriate printer. That's it in a nutshell. Any hardware or software errors would have been related to the system operator by means of the routing system. In future Op Spots I intend to examine certain parts of the system in relation to a "real" OS

How the operator communicates with IBM OS

THE following are commands which the operator uses in order to communicate with IBM OS. Each may be abbreviated to the letter shown in parentheses: START (S). This is used to start procedures. For example: S WTRJOB. MODIFY (P). This will alter the function of a procedure. For example, to specify the output classes served by a writer, the operator might enter: F 022,Class = 123pqr. STOP (P). Often referred to as the PARK command (as in parking a car), this is used to stop procedures. Format: P OOE. DISPLAY (D). This enables the operator to know the state of many of the systems resources. For example, to find out which tape drives are available for use he might enter the following: D U,TAPE. MONITOR (MN). Dynamically displaying the system's live tasks and the number of jobs on the queues, are two of the applications for MONITOR. The latter is achieved by specifying: MN N. SWAP (G). The operator can transfer a tape or disc volume to an alternative device by means

of this command. For example, if one drive is unable to read a particular tape, SWAP might be used in order to find out if another unit is able to do so. Format: G 140,141. VARY (V). Devices are placed in an online or offline state (in the former they may be allocated to jobs, or tasks, while in the latter they may not), by means of VARY. Example: V 140,Online. CANCEL (C). By means of this command, the operator can terminate a job at any stage of its processing, whether it be on the input or output queues; actually live and running; or being printed. Its format is as follows: C Jobname. MOUNT (M). Tape and disc drives are assigned to the appropriate media by MOUNT. Format: M 145,Vol = (SL,123456). UNLOAD (U). This has an effect opposite to that of the MOUNT command previously described. Format: U 145. SET (T). As shown in the following example, SET is used to specify such system parameters as the time and date: T Date = 78.250, Clock = 08.15.00. HOLD (H). Using this command, it is possible to defer the processing of a job by placing it on the HOLD queue. Format: H Jobname. RELEASE (A). Jobs are freed from the HOLD queue by this command. Format: A Jobname. RESET (R). The class and priority of jobs on the input and output queues may be altered by means of this command. Format: E, Jobname,Class = p, Prio = 5. REPLY (R). Certain system messages require a reply to be typed by the operator. To that end, he uses this command. Format: RID,Text. BROADCAST (B). Communication between staff at different work areas is the purpose of this command. For example, the operator at the master console might send the following message to those tending the printers: B 'MUR, Load payrolls on printer 001'. LOG (L). The operator uses this command in order to record

messages on the systems hard-copy log. It might be put to good use in keeping everyone up to date regarding the systems hardware. For example: L 'Unit OOE under service at 16.00'. L 'Unit OOE back in use at 17.40'. SWITCH (I). The system Management File comprises two data sets, X and Y, which are used alternatively by the system to record data relating to its throughput and performance in general. SWITCH instructs the system to close the active data set (in response the system reminds the operator to get the data printed) and bring the other into play. Format: ISMF. WRITELOG (W). The system log comprises two files, X and Y, of which only one is written to at any particular time. This command causes the active one to be closed and dumped to the output queues, and brings the second into play. Format: WL. DEFINE (N). This applies only to OS/MFT, under which it is used to specify the size of, and job classes served by, each par-

By Bernard Allen

HINT OF THE WEEK

A few tips on the maintenance of media

LAST week in Op Spot, Deborah Palmer, an operator at the Worthing site of the Gateway Building Society, suggested the manner in which a small to medium-sized tape library might be organised. And this week, she puts forward some tips relating to the maintenance of the media with a view to reducing the number of read/write errors that occur. "The need to clean tapes and drives, regularly, is not stressed enough," says Deborah. She continues, "The labels used for volume identification sometimes cause problems; as one is removed from a tape it leaves a residue which will eventually find its way to the read/write heads of one or more tape drives." It is better to use small cards and attach them to the reels by means of sticky tape, suggests Deborah. She also points out that "tape drives should be cleaned at the beginning of each day and immediately before any large job is run." I might add that front panels of tape drives should be kept shut at all times so as to prevent the accumulation of dust inside the units. I will be paid for any reader's hint published in Op Spot.

Underlapping — carry it out with care

MUCH comment has been generated by an Op Spot hint of several weeks ago (CW, September 14), relating to the alignment of pre-printed stationery. Writes one operator, "When there is a paper change, place the first form of the new box under the last form of the old one. Your suggestion to overlap the paper would result in two half-completed forms." I would like to thank this person and plead guilty. I did in fact mean to write "underlap". Rod Small, chief operator at the Automobile Association's site in Basingstoke, Hants, says that he is aware that I meant underlap and, while he agrees with the tip in principle, stresses that great care must be used. In relation to print quality he says, "If this method is used, extra attention should be paid to the print of the last page or two of the old boxload of paper. From experience, problems sometimes arise with print clarity and phasing because of the increased thickness of the paper." Concerning the actual alignment of the paper, he continues, "Attention should also be paid to the last page of the old boxload to check the horizontal plane of the lines of print. The reason for this is that the paper has greater play from the time it leaves the bottom tractor and is pulled only by the top ones." Normally, the operator will list the partitions and redefine them accordingly. Format: N List. HALT (Z). This causes the system to wind down, and must be followed by an IPL (load). Format: Z EOD.

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ICL adds floppy disc storage to 1500 series

FLOPPY disc storage and desk top packaging for the large-screen model have been announced by ICL for the 1500 series of transaction terminal systems. A new business-oriented Basic compiler has been introduced and, as forecast (CW, September 7), the Qume delay wheel printer has been added to the range offered with the 1500. The new 1920-character display desk top version of the 1500 is called the 1505, and effectively replaces the 1502 which offered similar features but had the electronics mounted in a desk pedestal. Twin integral single-reel magnetic cassette drives are offered as an option on the 1505, and the floppy disc drives come in either a desk top twin drive unit or a desk-mounted four-drive unit. The drives are dual-density CDC

devices also used with the ICL 7500 terminal range. The 1505 offers 8K or 16K bytes of MOS memory, and joins the 1501, 1501/40 and 1503 as the current models in the line. The 1501/40 adds a single disc controller to the basic small-screen model, while the 1503 takes up to 32K bytes of memory and can support up to four disc drives. A fully-configured 1505 with 16K bytes of memory, dual tape cartridges, four floppy drives and 100 cps matrix printer costs just under £10,000. In addition to the Basic compiler and Cobol, introduced earlier this year, software to emulate the ICL 7181 interactive communications protocol for linking to large 2800s is available, and interactive IBM communication facilities will be ready shortly.

Before Singer pulled out of the computer business, it was working on plans to develop the 1500 as a competitor for the IBM System 32. ICL has brought many of those plans to fruition, and has just introduced a complete 1500 package for estate agents called Easy, which includes rent accounting, a property sales system which matches clients to properties, and an optional mailing module. Installations of 1500s have doubled to over 10,000 since ICL acquired the product two years ago, and it is now a vital item in the company's portfolio. The company expects its business in small systems and terminals to match the industry profile by growing at three times the rate of mainframe sales over the next few years. Pictured is the 1505, which includes dual cartridge tape drives at the top of the unit.



Networking era arrives for Burroughs users

THE era of high level networking has arrived for Burroughs users. The mainframe company has finally announced its system software for those who wish to develop networks of interconnected computers, under the name of Burroughs Network Architecture, BNA. Burroughs has placed heavy emphasis on flexibility. BNA allows any element in a network to communicate with any other, or to consult any database. Job tasks and files can be transferred from one host to another, and jobs can be shared between different hosts. Two new control concepts are introduced with BNA. The first, Host Services, assigns various new capabilities to each host in a network. These are the co-ordination of communications between tasks being executed on a number of hosts, the ability to access a database held on a different host, the ability to perform file handling tasks in connection with another host, and the ability to cause a processing task to be performed on a different host. The other new control concept, Network Services, controls communications between hosts by means of Burroughs Data Link Control bit-oriented procedures. It also permits Burroughs computers to be interfaced to X25 packet switching services. Burroughs systems can already be linked to non-Burroughs systems via the NDL and MCS systems. As for programming, the existing Burroughs policy of keeping user application pro-

grams independent from the operating environment is preserved. BNA extensions have been added to existing supervisory software to enable existing programs written in Cobol, PL/I, Algol and Fortran to use the full resources of the network. Although BNA has been officially announced, the company is still vague about when it will become available, stating merely that this is "expected" to happen in 1979.

resources of the network. Although BNA has been officially announced, the company is still vague about when it will become available, stating merely that this is "expected" to happen in 1979.

Banks study chain of terminals in shops

THE feasibility of establishing a chain of banking terminals in shops and stores throughout the country is to be examined by a project team established by the major banks and credit card companies. The decision follows a two-year study by a working party, which concluded that such a system is possible. The proposal being examined is that the shopper, when making a purchase, should be able to use a terminal to settle his bill, the amount being charged to his or her bank or credit card account. The same terminal would be used for all banks, rather than one terminal for each bank in each shop. The terminals would be operated by a plastic card, used in conjunction with a security

number which would identify the card holder. Each transaction would be checked by the bank before payment was made to the shop. The banks are still cautious about taking this step. The project team will study the social implications as a priority, as well as working out the technical details, and a decision to go ahead will not be taken until well into the 1980s. The banks and credit card companies involved in the project team are Barclays, Lloyds, Midland, National Westminster, Williams & Glyn's, Bank of Scotland, Royal Bank of Scotland, Clydesdale, Co-operative, Central Trustee Savings Bank, Bank of England, Access and Barclaycard.

NCR profits up 68%

THIRD quarter turnover and profit figures from IBM, Control Data and NCR all show big increases over the same period in 1977. NCR was the star performer, with a 68% profit rise on continuing operations. At IBM, an 18.2% increase in net profit to \$51.6 million shows a dramatic improvement over the figures reported for the first and second quarters, which were only 2.8 and 5% better than the same periods in 1977. Turnover rose 15% to \$5,280 million, with advancing deliveries of the 3030 series mainframes being

credited for much of the improvement. Continuing a steady recovery trend at Control Data, profits rose 32% to \$24.1 million overall, but the company's computer business (excluding other divisions, which started 1978 with a 55% increase in turnover up to \$11.4 million) was up 28% to \$47.9 million. At NCR, profit from continuing operations — that is, excluding the Appleton Papers division, sold earlier in the year — rose 68% to \$380 million, from \$226.5 million on turnover up to \$1.5 billion.

CONFERENCE

The use of Computers in the Oil & Gas Industry

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Day One Thursday, December 7	Day Two Friday, December 8
08.45 Delegate registration	08.45 Delegate registration
09.30 Opening address	09.45 Computers and economics
09.45 Use of computers in exploration	10.30 Use of computers for stock control and preventative maintenance
Kindel P. McNeill, J. Sefel & Associates	11.15 Coffee
10.15 Offshore structural modelling simplified through interactive graphics	11.30 Use of computers for personnel logistics security
Peter Kite, BOC	Roland Bell, Rockall Data Systems Ltd.
10.45 Coffee	12.15 Lunch
11.00 Use of computers in production engineering. R. Schofield, BNOCK. S. Doherty, Global Technical Services Ltd.	14.00 Use of computers in platform design and construction.
J. M. Stacey, Chemshare Process Systems Ltd.	Dr K. A. Pike, Compeda Ltd.
12.30 Lunch	14.45 Use of computers in platform operation and control
14.00 Use of computers for drilling	15.00 Tea
Larry Flournoy, Drill-Tech Ltd.	15.15 Computers — future developments in the oil and gas industry
14.45 Computers for Planning from exploration to float-out	Alun Whitaker, Exploration Logging (Services) Ltd.
15.00 Tea	16.00 Conference ends
15.15 Computer aids for reservoir models. Dr David Wilson, Imperial College, London University	Approx.
16.00 Conference ends	

Delegates' fees include full report of the Conference proceedings, morning coffee, lunch and afternoon tea on each day booked. There will be no papers distributed in advance.

To reserve hotel accommodation, please contact: Mr Jack Ward, American Express Travel Service, Trafalgar House, 11 Waterloo Place, London SW1Y 4AS. Telephone: 01-930 4411

***** BOOKING FORM *****

The Use of Computers in the Oil & Gas Industry

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PEOPLE AND EVENTS

Edited by Nancy Pocock

An MD for military micros

A MANAGING director has been appointed at Systems Production Ltd, part of the Systems Design International group. He is Alan Wheeler, who is a director of Systems Design Ltd.

Wheeler has been involved with military aerospace systems for over 20 years and his first contact with computers came via work on Blue Streak and Lineman for Marconi. He was also seconded for a year to the Nudge consortium formed to set up an air defence system, where his function was the procurement of digital systems from the members.

He joined SDI in 1973 as a senior consultant on air traffic control and defence systems and in 1978 was made a director responsible for all project work.

Group chairman Philip Swinstead has been acting as MD of SDI since its formation in 1977. It was formed to provide micro-based products and systems using SDI's experience in the specification and procurement of hardware, particularly for military applications.

There are also plans for SDI to enter the field of development of



Wheeler

ruggedised industrial systems and here again, experience with military systems for use in hazardous situations will be utilised.

David Marwood, company secretary of SDI, has been appointed a director of International Computers Ltd, its main operating subsidiary.

Multiple appointments made at Quadrant Software

THE manager of the Sheffield office of Quadrant Software, Les Abbott, has been appointed to the board. Jeff Spencer, sales executive, has become technical manager of the Sheffield office.

Two new executives have been appointed at Quadrant Software. They are Peter Smith, previously managing consultant of Quadrant Recruitment's Manchester office, and David Swann, who was a consultant in the company's Sheffield office.

From CAP Northern, where he was a sales executive, George Gunn joins Quadrant's Manchester office in the same capacity.

John Kelly has become technical resources manager of Computer People Controls, a VLI Group company. His last job was as DP operations research team leader on a project in Zambia for Roan Consolidated Mines.

Also in the VLI Group are Software Implementation Ltd, where Mike Anderson has become sales and marketing manager, and Computer People Controls, where Tony Antonides, formerly a sales executive, has become sales manager for the South-East and several national accounts.

Obituary

Arthur Stapleton

THE death has occurred of Arthur Stapleton, founder of Advance Electronics Ltd.

He retired in 1959 but it was his company's success in the area of constant-voltage transformers and signal generators that prompted a successful move by Gould Inc, which acquired it in 1974, into the related fields of power supplies and test instrumentation.

ICL gives you dreams for lunch

A LUNCHTIME theatre in Fulham is being sponsored by ICL, whose corporate headquarters is just around the corner. Opening at the King's Head, Fulham High Street, on October 25 for a two-week run is a new musical revue called Mid-Day Dreams, a co-production by the Head Theatre Club and Amazon Theatre Co-operative.

Mid-Day Dreams is described as "a light-hearted look at the dreams and fantasies which often overtake our minds during the working day, whether in the office, the street, or at home". It was written by Chris Whiteingham and David Seabrook, who also provide the instrumental accompaniment.

Performances will be on Wednesdays to Saturdays at 1.10 pm and Sundays at 1.00, for two weeks. Pub food will be available.

Tom Turple has joined the Logabax OEM division as South of England sales manager for matrix printers and terminals from Trend Communications, where he was an area sales manager.

Bryan James, previously South Wales zone sales manager with Burroughs, and Peter Wilson, previously an accounts manager with Burroughs, have moved to Redifon Computers as account managers for the South-West branch.

Joan Almsworth has joined OGC Computer Personnel as a senior recruitment consultant. Previously she was with Force 8 Computer Services in the same capacity.

Tom Garner, managing director of the Kalamazoo Group, has been appointed chairman of the recently formed subsidiary Kalamazoo Finance, and group secretary Geoffrey Brailwhite has been made a director and chief executive of the new company.

OR award to Pactel man

A SENIOR consultant from Pactel, Adrian Williams, has won the Operational Research Society's first Prospect Award.

Williams' work for Pactel on a tanker production scheduling model for a Danish shipyard won him the award, which is to be presented annually to a member of the Society for a project which has helped to promote OR in the eyes of user management.

Worth £500, the award is sponsored by Prospect OR Recruitment of Hitchin, Herts.

Tony Woodlows has joined CMC as regional director, government, from Redifon Computers where he held a similar position.

Alan Segley has joined Scope Data Systems as an analyst/programmer for Computer Unit and 5800 systems. Kell Patching becomes credit control manager with the accounts department, having formerly worked for builders merchants W. M. Monks in the financial department, and Stan Hargreaves, previously a sales executive with NCR, Mohawk and Olivetti has been appointed South-East area sales manager with Scope.

CONFERENCES

A CONFERENCE entitled A Practical Approach to Installing Computers for Purchasing and Supply will take place on November 7 at the Excel Hotel, Heathrow Airport, London. It has been organised by the computer specialist

Calls for papers

PAPERS are invited for a conference on recent and possible future developments in the design and performance of RHV switching equipment, to be held on November 28-29, 1979. The conference is being organised by the power division of the Institution of Electrical Engineers in association with the Institution of Electronics Engineers and the Institute of Mathematics and its Applications. Synopses should be received before December 1 by the Organising Committee, IEE Conference Dept, Savoy Place, London WC2R 0BL.

A CALL for papers for the Fourth Conference on Software Engineering has been issued by its sponsors, the IEE Computer Society and Gesellschaft für

informatics. The conference is scheduled for September 17-19 and will be held in Munich. Five copies of papers, which should be 2,000 to 3,000 words long, counting figures as 300 words, are due by February 1, 1979, and should be sent to the programme chairman, Prof M. M. Lechman, Imperial College - CSD, 180 Queen's Gate, London SW7 2BX. Tel: 01-599 5111.

THE University of East Anglia is organising a conference on computational optimisation, which is to be held at the University on July 9-12, 1979. Papers of up to 3,000 words, in a form suitable for publication, should be received by April 2, by Dr V. J. Rayward-Smith, School of Computing Studies, University of East Anglia, Norwich NR4 7TJ.

DIARY

OCTOBER 23

Can project management of automation systems be improved? Colloquium, Institution of Electrical Engineers, Savoy Place, London WC2. 10.30.

OCTOBER 24-25

Software management, conference, American Institute of Aeronautics and Astronautics/Royal Aeronautical Society/Technical Marketing Society of America, Royal Lancaster Hotel, London W2. Details 01-245 4045.

OCTOBER 25-26

Mini and micro forum, (online, Brighton).

OCTOBER 26

Computers, an aid or an impediment to creativity, Mike Cooley, BCS 1978 Lecture Series, London School of Economics, London WC2. 10.30.

Meeting, 'The microcircuit takeover - a new challenge for management', IEE's Microprocessor Application Group, Savoy Place, London WC2. 5.30. Further information: Telephone 240 1871 ext 280.

OCTOBER 26

Student evening, BCS Edinburgh branch, Monaghan Road, Heriot Watt University, Edinburgh. Ticket only. Details Peter Barker, 031 556 8455, ext 113.

Plato, N. Spoonley, BCS Teesside branch, Teesside Polytechnic, Middlesbrough, 18.00.

Real time subtitling of television programmes, L. A. Thomas, BCS Leicester branch, Leicester Polytechnic, 18.00.

An integrated DBMS/DBS, Trevor Sankey, Geoff Baker, BCS Database Users Group, New Engineering Block, University College, London WC1. 18.30.

OCTOBER 27

One day seminar 'Getting into computing - for the distributive trade CDA and BCC, Manchester. Further details, George Kinners, tel 061-228 8333.

Demonstration by various manufacturers of recent equipment, BCS N Wills, Royal Holloway College, Surrey, 20.00.

OCTOBER 27-28

Operations group meeting, IBM Computers Users' Association, Newcastle Central Hotel, Newcastle-upon-Tyne, 10.00.

CORAL NEWS

which, in Computer Weekly, October 12, 1978, incorrectly carried the text from the first CORAL NEWS of January 12, 1978.

The correct text will appear October 26, 1978.

DEVELOPMENTS in distribution of computer systems has been organised by IAG, the IAP Applied Information Processing group, and will be held on November 22-24. It will be held at the Hotel Hilton, London W1. Details: Prof M. M. Lechman, School of Computing Studies, University of East Anglia, Norwich NR4 7TJ.

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White House calls for DP shake-up

From Cameron Davis in Washington

"UNLESS something is done soon to improve significantly the way information technology is being used in the federal government, the general wellbeing of the United States will be seriously jeopardised." That was the basic conclusion reached by President Carter's Reorganisation Project on Federal Data Processing. A "discussion draft" of the DP reorganisation team's final summary report, which will be forwarded for President Carter's consideration, was circulated last month among the 10 task forces that contributed to the project. Revisions to the first draft will be made this month and the final report is expected to be completed by October 31.

Firms fight US govt controls

THE CARTER Administration must adopt a policy of "non-intervention in normal commercial transactions between American firms and their overseas customers, or suffer irreparable damage in the entire US economy."

"That warning was issued by the Computer and Business Equipment Manufacturers' Association in a tersely worded letter to President Carter."

The use of foreign trade as a political weapon has already "harmful competitive position in international markets," wrote CBEMA president Vico Henriques. Without making a specific reference, Henriques obviously was alluding to the remarks at the President's veto of the United States' system sale to the Soviet navy agency, Tass.

The CBEMA executive told President Carter that foreign trade should be viewed as an important component of the country's national welfare, and as a tool in political warfare. Export decisions should not be based on "such ethereal concepts as universal human rights," Henriques said.

"The US share of world exports has already declined from 18.8% in 1960 to 15.4% in 1976, and continues to decline," the CBEMA letter stated.

It also noted that America's role as the world's leading exporter of high technology goods and services is being threatened by other industrialised nations, citing Germany and Japan in particular.

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PDP-11/34 for Dulwich College

A MAJOR step in an already ambitious programme of computer education has been taken by Dulwich College, South-east London, in acquiring a complete PDP-11/34 system for its use. Eight terminals, a mixture of DECware and VDUs, have been installed, with two disc drives, a line printer, and a magnetic tape unit.

Dulwich has had a computing centre since 1968, up to now using terminals to an outside bureau. The picture shows two pupils working in the terminal room which adjoins the machine room.

The machine is running under RSTS/E, allowing pupils to program in Fortran, Basic and Assembler. The computer is also being used for a considerable amount of school administration.

School timetable planning software

FURTHER software for school timetable planning is available from Oxford Systems Associates (COW, Feb 9). This is the Oxford Course Planning Aid, which is designed specifically to help

with the problem of option grouping. In its standard version it allows an unlimited number of students to select up to seven subjects each from a choice of 54.

OXCPA, as it is called, is written in Basic and will run on a microcomputer with 32K of memory. The program costs £95 in the standard version.</

Some of the best activities of the British Computer Society are initiated by the BCS specialist groups. These groups are organising a conference in London from January 4 to 6 called

BCS 79, Living with Computing. In this series of articles, the work of the specialist groups and their BCS 79 plans are described. This week the focus is on word processing and its implications.

WORD processing has been described as the application of electronics to the typing process, by which is meant the complete activity from the capture of text, through its manipulation to its distribution and printing. It thus embraces text preparation on terminals, consisting of keyboards, with or without VDUs and with or without hard copy devices, and its dissemination over telecommunications links or through the mail to other similar devices or to the final recipient in an appropriate number of copies.

This is an area where many changes are taking place as a result of the introduction of modern technology. Replacement of typewriters by word processors extends the capability of typists to handle work, particularly repetitive work and the retying of drafts. Indeed, estimates for increased productivity range from 25% to 40%. This has clear implications regarding the reorganisation of office work, and may well lead to a significant loss of job opportunities, if not to actual unem-

Word Processing Specialist Group's role



The author, Professor Sandy Douglas.

ployment, where up till now a continuing expansion in employment has taken place over many years.

Moreover, the possibility of linking word processors over telecommunications, and of extending their capacity to

handle files, is considerable. The linking of local systems can be done in such a way as to allow the preparation of a document on one machine and its reproduction subsequently on one or more remote machines, thus passing over the telecommunications link what might otherwise be produced as local hard copy and sent by mail.

Finally, the processes of reproduction in hard copy are undergoing change with the introduction of cheaper and more effective photosetting equipment, which is itself computer driven. There is an increasing tendency to carry out printing in-house rather than sending it out to printers, and to integrate this printing into a more general procedure for reproduction of documents using, for example, photo-

composers working off hard copy.

While it is not the primary role of the Group to explore all the social consequences of these significant trends, nevertheless it is impossible to discuss word processing without an awareness of them.

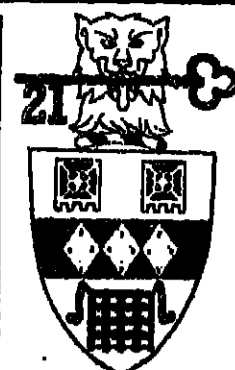
The Group naturally has as its primary interest the exchange of experience regarding hardware and software included in word processors and of know-how with regard to their choice and introduction. However, in the last year we visited not only several manufacturers but also the NPL to discuss the impact of schemes such as SCRAPBOOK and of their fast laser-driven output equipment. It is intended to continue to keep the manufacturers' offerings under review in the coming

year, while at the same time making visits to such related projects as Inspire, the IEE system for dissemination of technological information.

The presentations in January will reflect the range of interests of the Group, with a general discussion of equipment by Brian Parkinson and a talk on its application in Unilever by Alan Patterson, followed by more general discussion, which may well touch on some of the social issues mentioned above, since one of the panellists is Barry Sherman of ASTMS.

It is hoped that a number of exhibitors will be showing off the tricks that can be performed with word processors both during the more technical part of the conference and on the Saturday popular programme.

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LETTERS

Leaving it to bosses invites chaos

YOUR correspondent I. Drummond (C.W. October 5) asks whether the establishment and maintenance of professional standards in computing should not be left to employers instead of other bodies, because so many of those involved in computing are in employment rather than being self-employed.

I think the place of employment or whether one is self-employed have nothing to do with the matter. The fact that most engineers, for example, are employees does not lessen the need for standardising and professional bodies in engineering. To leave such functions to thousands of (competing) employers is to invite chaos, and anyway the employers' interests are not always the same, between themselves and vis-a-vis the public.

Where I am sure that Drummond and I agree is that employers have a vital role to play in the establishment of standards and their maintenance thereafter, and that it is in their interests to have staff who are fully trained.

PAUL SAMET
President

British Computer Society

Survey analysis packages

I WOULD like to correct certain information given in the article on Survey Analysis Packages (C.W. September 28).

ASCOP, ICL Datskill has no direct connection with this package. Dr B. E. Cooper, the author of ASCOP, who now works for Datskill, may be able to answer some questions. We do not know from whom information should now be obtained.

DAS, Information from ICL Datskill/local ICL office.

PACKAGE-X. Requests for information from UK government funded bodies should be addressed to CSO. Requests from other people should be addressed to ICL Datskill.

XDS2/3. Information from ICL Datskill/local ICL office.

XDSF. Information from ICL Datskill/local ICL office.

A. E. THOMAS
Manager, Data Analysis Unit

Advanced Systems Sector
ICL Datskill Ltd,
Reading Bridge House,
Reading RG1 8PN

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondence states that their letters may not be cut.

Eighth UK plant

AN eighth UK plant is planned by Burroughs, ultimately offering employment to 200 people. The 100,000 square foot facility is to be built at Livingstone New Town in Scotland and will become a centre for research, design and manufacture of high technology products.

NEWS IN BRIEF

Europe debut for Cray 1A

THE first Cray 1A system in Europe is due to be delivered at the end of the month to the European Centre for Medium Range Weather Forecasts at Shinfield Park, Reading, Berks. The one Mword machine will take over from the Cray 1B, 500,000 word installation at the UKAEA Rutherford Laboratory at Chilton, Oxon, on which ECMWF programs have been developed. That machine will then be used by the Defence Ministry until the Cray 1A ordered for the Atomic Weapons Research Establishment at Aldermaston (C.W. April 28), is delivered early next year.

'Relax rules' plea

LAUNCHING a campaign for relaxation of export rules for computers to the Eastern bloc, the US Computer and Business Manufacturers Association has gained backing from a study by the Brookings research institute which points out that the business generally goes to other Western countries, and even in the case of advanced military computer systems, the Soviet Union was capable of developing alternative solutions.

Micro version

A VERSION of Algol-60 designed to run on Z80-based microcomputers under the CP/M operating system is being made available by Research Machines. To complement it, versions will be available for the DEC PDP-8 and PDP-11 machines as well. The Z80 version, which will cost £99, requires a minimum of 20K bytes, while the PDP versions, costing £250, require 8K words minimum.

Wake up to micros

"A BLAST" to wake up people in education to the impact of microprocessors" is the intention of a conference being held on November 27 by Stockport Education Authority. The conference will be aimed at local industrialists as well as teachers and administrators, in order to deal with the way business may be affected by new methods of automation, and how this affects the training that young people need. Owing to limited accommodation, attendance will be by invitation only.

Yesterday's branch office



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N.W. England: Specialist Office Equipment, 209/273 Barrow Wood Road, Chorlton-on-Medway, Manchester, Tel: No: 061-881 0787 Telex: 667161

Ireland: Technico (Communications) Ltd, Adair House, Adelaide Road, Dublin 2, Ireland Tel: No: Dublin 688222 Telex: 5129

Goonhilly to test speech squeezer

A WAY of squeezing a quart into a pint pot is how Cambridge Consultants describes the digital speech interpolation equipment it has developed for the Post Office, and which is now being installed at the Goonhilly ground station for working tests via Intelsat.

Using a complex distributed microprocessor approach based on seven Texas Instruments TMS9900, 16-bit chips, the equipment has been designed to double the capacity of time division multiple access, TDMA, links without adding to the space segment costs.

To achieve this task, the system works dynamically seizing and re-allocating channels during conversational pauses, so halving the number of channels required to handle a given pool of speech signals.

Included in the £200,000 development contract placed by the

Post Office was a requirement to build a speech activity simulator so that the system could be tested.

Based on two Intel SBC 80/10 microcomputer cards, this has to simulate the speech activity of up to 240 terrestrial channels. The simulation is based on stored statistical distributions of various parameters found in a typical conversational pool. To evaluate the interpolation equipment, one or more test channels are monitored continuously while the simulator loads the equipment with dummy traffic.

The basis of the DSI equipment's operation lies in providing accurately timed bursts of data within the TDMA time frame. The frame itself is 750 microseconds in duration, and consists of bursts of data transmitted to a satellite from all the ground stations within the satellite's area. Each burst is timed to arrive at the satellite at a pre-determined point within the time frame, and consists of data transmitted at a rate of 5125 Mbits per second.

This data is made up of a preamble, which gives such information as the transmitting

station's identification code, and up to eight sub-bursts from the DSI systems attached to the ground station.

The sub-burst contains the 120 satellite channels being transmitted together with an assignment message which, when received at the receiving ground station, gives instructions on the changes in routing of the satellite channels.

Changes in channels are made on the basis of voice activity on the channel, and the level of demand for channel access. When the demand from the 240 terrestrial channels exceeds the capacity of the 120 satellite channels, voice activity is monitored. Unused channels are then switched to another terrestrial channel. This process is repeated with every sub-burst.

Several other countries are testing similar systems, but the majority of these are based on single microcomputers controlling the whole operation of speech interpolation. By going to a distributed micro approach, Cambridge Consultants feels that the Post Office, though later in the field, may well have got a better deal.

National Semiconductor launches Codec chips

A QUIET entrant into the market for Codec chips has been National Semiconductor. Even though the devices were formally announced only last week, they have been in production since January, and are now available off the shelf at a price of \$20 per set at the 100-off level.

The two-chip system, designated TP3000, has been designed in collaboration with several major telecommunications equipment manufacturers, both in the US and Europe, and meets both US and CCITT specifications. The chips contain all the necessary elements for a complete single channel pulse code modulation Codec, providing both input and output sample and hold, non-linear digital converter, comparator, on-chip voltage reference, successive approximation logic, 1/1 buffers, auto-zero circuitry and the necessary control logic.

Two versions of the set are available; the TP3001, uses the u-law coding for analogue signals, and the TP3002, using A-law specifications.

National uses a CMOS process to implement the digital functions of the circuit, while the

analogue portion is executed in the company's BiMOS process. These processes have been chosen primarily because the life cycle of the chips will have to be of the order of 20 to 40 years. Both processes have been in use long enough to acquire a long enough history of reliability.

The chips sample a filtered analogue signal at an 8kHz rate, converting it to an 8-bit digital code. This can be transmitted at any data rate between 64 and 2,100K bits per second.

The initial market seen for these chips is in local exchanges, according to Kurt Slem, National's director of telecommunications marketing. The ideal situation of having one Codec per handset he sees as being some way off. "There are engineering problems that go against using Codecs in telephone handsets," he said, "and in addition there is the cost factor. A handset currently costs about \$9 to produce, so even if a Codec set cost \$3, it is still not on."

Another important market for the devices is liable to be in office communications products.

Off-the-shelf DG stockist

THE availability of 16-bit microcomputers from the traditional minimakers is making new marketing methods essential, and Data General is pioneering the use of stockists who can offer off-the-shelf delivery of items like the MicroNova.

In the UK Data General has appointed Celdis of Reading, part of the £33 million Unitech group, to handle the MicroNova and associated integrated circuits, system software and peripherals.

Celdis already markets a wide range of semiconductor devices from companies like Motorola, Fairchild, Mostek and Nippon Electric, but the MicroNova is the first 16-bit device handled by the company. It has 2760,000 of parts in stock and is investing an initial £100,000 in Data General components, the largest being a 10 Megabyte disc drive.

This month, ICL celebrates its tenth birthday, although the history of the company is much older, because most of the pioneers in British commercial computing, like British Tabulating Machine, Power-Samas, Leo, Ferranti,

Elliott Automation and Marconi had contributed to forming ICT and English Electric Computers, the companies which merged in 1968 to form ICL.

In Computer Weekly's ICL birthday feature, Tim Palmer

interviews ICL's current managing director, Dr Chris Wilson, about ICL's achievements in its first ten years and his hopes for the future (this page). And on pages 16 and 17, Fred Lamond analyses ICL product strategy.

'No merit in coming second'—Chris Wilson



AHEAD OF THE FIELD...

"No one can be ahead of the field right across the board, but we have to be ahead of the field in some areas — and I think we always have been."

"There is no one thing which you can identify in 2000 architecture as being outstandingly new; you can talk about stacks, virtual memories and so forth, but the strength lies in the combination and in the fact that current techniques were designed in- rather than being added as afterthoughts."

From the day he took over as managing director of ICL 11 months ago, Dr Wilson has consistently stressed the importance of services in the continued growth of the company's business.

"This year, we have provided 30,000 man-weeks of training, nearly two thirds of it to non-ICL personnel," he said. "We have provided 1,000 man-weeks of training under the Manpower Services Commission's TOPS scheme; that breaks down into

30 people on 20-week systems analysis courses and 40 people on 10-week programmers' courses."

"Once we have trained them, we endeavour to place them, and I'm told that we have had 100% success in finding jobs for the people we have trained under the scheme."

"We are also planning to stage high technology seminars and we already have development seminars over two or three days for company directors, which attempt to demonstrate to them how they could use computing more effectively in their businesses."

"Most of our training is still done in the UK, but we have about 240 lecturers on our staff, operating in 30 countries."

Dr Wilson has already identified Continental Europe as a

major growth area for ICL services, and that includes training.

"We need bigger training centres in Europe, and we are making a heavy investment, but nowhere near the scale of what we are doing in the UK," he says.

"Overall, Datasilk is about doubling its turnover every two years, and the opportunities for setting up a Datasilk operation in each country are good. I believe it is quite possible to build up a software, systems, applications and perhaps turnkey contracts company from scratch, but bureaux are another matter."

"I think it would be difficult now to start bureaux from nothing, and acquisitions lead to traumas. In other parts of the world — Australia, New Zealand, Singapore, South Africa, Nigeria, Zambian — we have bureau operations."

"If the right opportunities for acquisitions occurred in Europe, we would consider them, but they are not part of our plan."

"It is estimated that, by 1981, the total European expenditure on all aspects of data processing will be £15,000 million, and the services element of that is enormous. The opportunity is there, and we can increase our share by development of our own staff and by Datasilk-type operations."

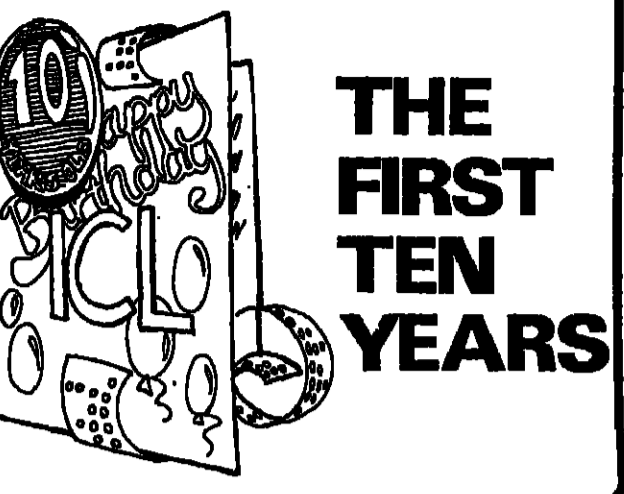
Like his predecessor Geoff Cross, Dr Wilson believes firmly that the single-tender policy for computer procurement by the government is vital, not only for ICL but for the whole UK computer industry and indeed the nation as a whole.

"He goes further. "I believe that the EEC should have a procurement policy, because I think it would be quite wrong for the only major supplier of computers in 10 or 20 years to be America or Japan."

"When the rules governing computer procurement by EEC governments expire in 1980, I believe that the EEC should substitute a Community-wide policy similar to that of the UK government."

Dr Wilson diplomatically declines to say whether he regards the 33% French-owned CITI Honeywell Bull company as European in this context, but does he spell out the details of what he has in mind. But the main implication is that ICL and other European manufacturers like Siemens should be given favoured access to government contracts in countries like Italy and Germany, as well as the UK and Ireland.

Suggestions have been made in the National Enterprise Board for ICL to become a major player in its own right, a greater British computer and office communications industry.



S. African problem

THE two biggest problem markets in ICL's worldwide empire today would appear to be South Africa and the US — the one for reasons of outstanding success, the other for comparative failure.

"I do not necessarily accept the statement that ICL is likely at some stage to have to withdraw from South Africa. Our job is to run the company as effectively and efficiently as we can, and South Africa is the same as anywhere else. We always operate under the laws of the countries where we do business, and under the law as laid down by the UK government."

"We have had a request from the South African government for licences to manufacture some of our products there, and we are considering the pros and cons of a licensing agreement with them."

"Our business is running at close to £50 million annually there. This makes the subsidiary a little bigger than ICL France, but not much. I am not aware of any African country threatening a boycott of our products because of our South African business, and do not fear that we will lose business in Nigeria; the Nigerians trade with South Africa themselves."

Turning to the United States, ICL's ambitions there seem to have become more modest over the past year.

"I do not see ICL Inc ever representing more than 2 to 3% of our total business, and I would be quite happy in five years' time to see it a small, profitable company doing about £30 million a year," says Dr Wilson.

"We found that we were spread too far in the US, and we have done some retrenchment; we are also reviewing our relationship with our dealers."

"We are selling 1500 and System Ten 220, and market the 2803 in a slowly widening area around New York."

"We now have a recognised presence in the US to assist our credibility in the rest of the world, and eventually we shall introduce the large 2800s there in a controlled manner. Selling 2800 in partnership with a US company is not now being considered."

reorganisations of the industry. "I never get involved in discussions about bringing companies together," he says firmly. "I think it is very damaging to the companies involved to talk about it, and people who do often insecure about their own companies."

The major challenger to any computer manufacturer is, of course, IBM, and companies have tried two ways to emulate IBM in the computer business. One is to copy slavishly every product that IBM introduces in the hope of picking up crumbs from the giant's table. The other is to emulate the general business principles which have been a major factor in IBM's success — a policy particularly emphasised by that phenomenon of the German computer industry, Heinz Nixdorf. Dr Wilson's thinking clearly follows the same lines.

"The rental and service element of ICL's revenue is second only to that of IBM, and will continue to grow as a proportion of the whole; that is what the game will be all about in the future," he says.

"Software pricing has always been a part of our policy; we started to unbundle before IBM did."

"In the future, the added value will come increasingly from marketing activities, and the value of our maintenance and other services is growing as fast as the return on hardware."

"We do make predictions of what IBM will do in five years' time, and our plans are in place to deal with it. Five or six years ago we were concentrating on the overseas market, and Big Brother was not so much a threat as it is now."

'£1,000m company in five years'

DR WILSON is keenly aware of the new responsibilities imposed by the formidable growth of the company.

"During our growth, we were necessarily rather inward, but ICL is a large company now. In five years' time we will be a £1,000 million concern, and few other British companies are as big as this."

"We have a responsibility externally as well as internally, and we need to be more outward looking. We see a lot of people from both major parties from time to time, and as the computer industry grows, people's everyday lives become more important," says Dr Wilson.

Although office automation will become more important in ICL's business in the future, Dr Wilson does not see the company getting into the computer business as IBM has

done. "Things like the 3760 telephone switching system should be left to Plessey," he says.

Neither is he interested in taking ICL into the general-purpose minicomputer business as Geoff Cross wanted to do.

"The OEM minicomputer business is a very risky one. We will sell our products to software systems houses, but they will be products which we require for our own business. And I do not see us going into process control in the short term, as the minicomputer business is not one to get into."

Minicomputers for the home market are not ICL's business, and neither are mainframes. ICL's business is in the computer business, and ICL will stay in the computer business.

network strategy; does it need one?

"We will announce our network strategy when it is ready. A global network strategy has to be a business strategy, and we have been in the business since IBM announced to quit with us. We have been in the business since IBM announced to quit with us. We have been in the business since IBM announced to quit with us."

"Overall, our strategy is to be a major player in its own right, a greater British computer and office communications industry."

"I have had no hint of this from the NEB," says Dr Wilson. "The NEB has not said anything about ICL, and we have had no hint of this from the NEB."

THE
FIRST
TEN
YEARS

Bold gamble to win the 'information market' of the 80s

AT the time of the 1968 merger, the announced models of the 1900 Series and of System 4 paralleled each other all the way from the price-performance level of the IBM 360/20 to that of the 360/65. See Table 1.

The customer bases of the two series were much more complementary. The 1900 Series dominated the British and Commonwealth markets for small to medium sized systems, but the largest systems installed in any number at that time were the 1904E and 1905E, as well as the earlier 1906 and 1907 of roughly equivalent power. Deliveries of 1904F and 1905F systems were only just beginning, and those of the equally powered but more advanced 1904A were not due to begin until 1970.

As for the radically re-engineered 1906A, announced in September 1967, it was at that time little more than a paper tiger which had collected no more than a single letter of intent.

English Electric Computers customer base, on the other hand, lay mainly among a small number of large users, notably the Post Office. Deliveries of 4/70s had begun to replace earlier KDF 9 and LEO 326 systems, and orders for this top-of-the-range system were quite substantial. It was at entry level that the 4/30, whose design had been subcontracted to Marconi as part of an internal English Electric political battle, had been somewhat of a disaster story.

Since the Ministry of Technology's main reason for pushing the two surviving British mainframe manufacturers into a merger had been to eliminate wasteful duplication of development effort on identically powered products, ICL could thus have undertaken some immediate drastic pruning of its product line without upsetting any customers.

At the lower end it could and did pension off the 4/30 as fast as outstanding contractual commitments to Marconi permitted, and converted the small number of 4/30 users to 4/50 systems by 1971. This left the whole small system field clear for the successful 1900 Series.

At the top end, no one outside West Gorton would have missed the 1906A if ICL had then quietly withdrawn it. The announced power of the 1904A gave ample top cover to the existing installed 1900 user base, and it seemed likely that processor design could in time be stretched further with later and faster components, as indeed it was in the 1904S announced in 1971.

Beyond that, the obvious growth path for medium size 1900 users and the more substantial number of 4/70 users lay to a large 32-bit word processor that would have implemented a superset of both the 1900 and System 4 order code.

Such a joint superset processor would not have been very difficult to design. For apart from their dissimilar data structures, 1900 and System 4 processor architectures were really quite close (Table 2). Both used a "one-and-a-half address" type of processor logic, in which one operand is fetched from an indexed main memory address, while the other is fetched from, and the result stored in, one of a small number of general purpose registers, some of which can also be used as index registers.

Within this common design philosophy, System 4 had the more complex architecture of

the two series, offering notably a larger number of registers of greater width, and a larger range of arithmetic operand types. It would thus have been far easier to emulate the 1900 machine code on a System 4 processor than the other way around. The only instructions that would have to be added to System 4 360-compatible machine code were the 1900 indirect addressing facilities, in

the IBM 360, it was essential that ICL offer at least one equally homogenous computer family from bottom to top. These 1968 remarks acquire their full flavour when read in the context of ICL's current product range 10 years later (Table 3). Leaving aside the System Ten and 1500 series acquired from Singer only two years ago, ICL's successor 2900 series offers an even greater diversity

2900 series is in fact a wholly new general purpose computer series, that is not upward compatible other than via conversion aids with either of ICL's two computer families of 1968. ICL is the only major mainframe manufacturer to have introduced such a new series in the last 10 years, and the only one to have imposed such an upheaval on the source program and data file libraries of its large

were seen as the main large user requirement of the 1980s—large information systems, concerned far more with database inquiry, updating and manipulation, than with the calculation tasks of the traditional Von Neumann computer. It was in order to fulfil these tasks as efficiently as possible with the minimum of user programming effort, that ICL designed the 2900 series with its virtual machine concept, multi-level indirect virtual memory addressing, 4,000 Mbyte address range, and pushdown stack processing.

It was a bold and imaginative leap which one hesitates to condemn. IBM was beginning at that time the development of the FS series and the Q operating system with much the same aims in mind. If it had succeeded in bringing these to market in 1976-1977 as planned, ICL could only have survived on the mainframe market by offering its users an equally imaginative systems design.

Both IBM and ICL seem to have underestimated the throughput bottleneck caused by attempting to implement so many different functions on a centralised mainframe operating system, as well as the time required to implement such an operating system efficiently. But when IBM came up against these obstacles in 1974, it had enough contingency plans in its drawers to be able to cancel FS and Q and write off the millions spent on them to expense.

ICL, on the other hand, seems unwisely to have committed its main R&D resources much too soon to the new series, and allowed both System 4 and 1900 Series hardware to wither on the vine from 1972 onwards. Apart from semiconductor memories introduced between 1972 and 1974, the last 4/72, built in 1975, and the last 1902Ts and 1903Ts, built in 1977, were little different

in processing power, main memory expandability and peripherals from their predecessors of 1968.

The restrictions this caused on both System 4 and large 1900 users' ability to expand caused them to put increasing pressure on ICL to announce its new series.

When ICL did launch the 2970 and 2980 in November 1974, it was much too early in the VME/B development cycle. Their early users were soon vociferous in their complaints about the new system's low throughput and MTBF. According to one 2970 user, it is only now, four years after its launch, that VME/B allows him to get the same job throughput on his 2970 as he was able to get on his 1904S using George 3. This has given the 2900 series a bad name in the marketplace, which it will take a long time to live down.

ICL seems also to have waited much too long in the 2900 series development cycle to give serious thought to ways of bridging 1900 and System 4 users to the new series.

Microprogrammed emulators did not become available under VME/B on the 2970 until 1976; and DME, to allow 2900 users to run the system entirely as a 1900 or System 4, until 1977. And DME does not allow 1900 mode users any larger main memory space than they would have had on a fully expanded 1904S.

In thus forcing its large users to convert their main source programs and data files in order to be able to grow, ICL product planners not only disregarded those users' interests in their investment in source programs, they also ignored the prime rule of computer customer base preservation: to make it at all times easier and cheaper for customers to stay rather than to desert to the competition.

As a result, ICL has in recent years lost a much larger proportion of its big systems users than other mainframe manufacturers when those users reached the maximum expansion limits of their old systems. The lost causes include British Oxygen, Pilkington's, Leicestershire County, Gloucestershire, GLC, Tesco, Norwich Union, to name but a few.

ICL's total share of the UK installed computer base by value is reckoned by IDC Europe to have dropped from about 35% in 1968 to 28% in 1978. During the same period, Siemens share of its West German home market rose from 8% to 18% if one ignores the 6% share inherited from Telefunken Computer in 1974.

In private, ICL executives are sometimes prepared to admit these days that they would have had none of this trouble in the last 10 years if they had gone for the safe solution of basing their large systems designs on System 4 or a System 4 + 1900 superset. But in the 1980s, they say, their bold gamble will be justified by events. Then, ICL will have a established product range to offer, at a time when other mainframe manufacturers will have to convert their hardware architectures to tackle their users' information system requirements.

ICL will only be able to regain its lost market share at other

When ICT and English Electric announced their intention to merge their data processing activities in April, 1968, they undertook to continue to develop both the 1900 Series and System 4 to meet the needs of their respective customers until such time as these two ranges could be superseded by a common successor range.

The unstated but generally understood meaning of that promise was that the future common successor range would offer both System 4 and 1900 users a smoother upgrading path than a forced conversion from System 4 to 1900 standards or vice-versa would have done.

In this 10th anniversary feature Fred Lamond examines how far ICL has kept this promise to its users, and how content these users have been with the new 2900 series.

manufacturers' expense, however, if these are equally unwise and unlock their customer base and forcing their users to convert their source programs in order to grow. Nothing is less profitable.

Honeywell has already demonstrated on its Series 60 how many different processor hardware architectures can be accommodated under a common operating system with upward compatibility. Now IBM is planning to use OS/MVS as the cloak under which to replace the centralised 370 architecture by a more modular multiprocessor design, in which 370-compatible "processing engines" co-exist with specialised back-end database inquiry, updating "engines", and others.

Such schemes preserve existing users' applications software investments, as ICL did not, so that those and the force of inertia will tend to keep most of their loyal to their current suppliers.

If ICL succeeds in winning back a larger share of the private commercial and industrial large-user market in the 1980s, it will not be because of the stack processing architecture and 4,000 Mbyte addressing range of the large 2900s, but because they will be the first mainframes on the market that can be equipped with truly parallel processing (Distributed Array Processors (DAP) and Content Addressable File Stores (CAFS)).

These are truly worthwhile revolutions in computing and ICL can be proud of making a world lead in them. But ICL could have fitted DAPs and CAFS just as easily to large systems developed from the 370-compatible System 4, and how much easier such systems would then have been to sell to the huge customer base of IBM 370 and compatible system users.

Meanwhile, while the large 2900 series systems have been eating up ICL's R&D resources, its income and profits have been contributed mainly by the 1900-compatible 2903/2904 range as well as by the System Ten and 1500 series bought from Singer. It is vital for ICL's future stability and profitability that its currently well satisfied 2903 and 2904 customer base should not be put through the same unnecessary aggravation as the large 1900 users in the 1970s.

ICL should not, therefore, try to drop the 2903/2904 range, even when it has brought small

and cheaper native mode 2930 and 2940 systems to market running under a more compressed VME/K. Nor should it attempt to convert 2950 DME users to VME/K and the 2900 native mode when they have reached the limits of DME.

On the contrary, ICL should maintain and continue to develop the 2903/2904 range side by side with the larger 2900 series indefinitely into the future, as Univac has decided to do with the Series 90 and 1100, and as CII-Honeywell Bull intends to do with its Series 60 Level 64 side by side with the HIS-developed Level 66.

This means among other things raising the current 256K 24-bit word main memory limit on 2950 and 2960 systems (running under DME 1900). It is a limit in no way imposed by 1900 processor architecture (whose 22-bit address mode allows up to 4M words to be addressed indirectly and in indexed mode) but solely by the ESRM executive from which Exec 2, Exec 3 and DME-3 have been developed.

It has not been noticed by small business and distributed processing users so far, but will become increasingly welcome as main memory becomes cheaper and memory sizes of two or even four Mbytes become more common on rival systems such as the Digital Equipment TRAX.

It is doubtful, however, whether internal ICL product planning policies will allow this to happen, unless it is decided to follow IBM's example and split the company into two separate components, one for small and one for large systems. The 2903/2904 range and all the ex-Singer products would become the province of a small systems company comparable to IBM's General Business Group.

On present showing this would be a highly profitable dynamic and expanding company on world markets needing no government support whatsoever, provided it was free to plough back those profits that it does not distribute to shareholders into its own lines. The future competitiveness on world markets of the smaller systems should not be weakened by a continuing drain of the R&D funds that they have earned, to develop a large general purpose computer series with a much less certain future outside a British government protected market.

Hopes for the future

From page 15

so much these days. "But our job is to manage our business in the most effective and efficient way in the interests of our shareholders and staff, and taking account of IBM has to be a part of that."

Looking to the future, there have been some doubts about ICL's future commitment to unique high technology products like the Distributed Array Processor and the Content Addressable File Store.

Dr Wilson firmly quashes any doubt. "We have to continue to

develop products like these," he insists. "No one company can be ahead of the field right across the board, but in some areas, ahead of the field in some areas, and I think we always have been."

"Two examples where we are ahead are in multi-layer board technology and in microcoding techniques. "We are always prepared to take the lead in products of this kind, and we have a unique high technology product like the Distributed Array Processor and the Content Addressable File Store."

	IBM		ICL			
	General Business Group	Systems Products Group	2900	System Ten	1500	
Parallel processing super-computers	—	—	VME	1900 DME	—	—
	—	—	2576 + DAP	—	—	—
	—	—	2572 + DAP	—	—	—
Large and very large serial processing systems in the ATLAS-Plus category	—	Model 3033	—	—	—	—
	—	3032	2976	—	—	—
	—	3031	2972	—	—	—
Medium-sized models	—	370/138	2950	2950 DME	—	—
	—	125	—	2950 DME	—	—
	—	115	—	2950/50	—	—
System 3/15 3/12	—	—	—	2903/25	—	—
Multi-station transaction processing systems for distributed processing and small businesses	System 34	—	—	—	Ten/220	—
Single-station systems	System 32	—	—	—	—	—
Desktop system	5110	—	—	—	—	1500
Language: Cobol	—	3/12 & 3/15 only	Yes	Yes	—	Yes
RPG II	—	Yes	Yes	Yes	—	—
Fortran	—	Yes	Yes	Yes	—	—
Basic	—	Yes	Yes	Yes	—	—
APL	—	Yes	Yes	Yes	—	—
PL/I	—	Yes	Yes	Yes	—	—
Operand length (bits): Floating point	32	32	32, 64, 128	48	—	—
Fixed point binary	—	—	16 or 32	24	—	—
Decimal (digits)	1-31	1-31	1-31	—	1-10,000	1-31
Alphanumeric character (bits)	8	8	8	8	8	8
Individual addressable	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: IBM and ICL ranges available today in rough order of comparable processing power.

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A masterly game and a rewarding challenge

By Donald
Michie

IN the razzamatazz of world championship computer chess we have been hypnotised into overlooking some very remarkable home produce. The first seeds of the British program Master were sown by Alex Bell. Tended and trained by John Birmingham of AERE, and Peter Kent of the Rutherford Laboratory, Master has reached a point of maturity at which it probably has more built-in chess knowledge than any program in the world.

Why then did it not scoop the world pool at Toronto last summer? Remember that it suffered a 2:1 disadvantage compared with Moscow's Kaissa because of the communication delays imposed on remote operation by the tournament rules. As for Chess 4.6 we can throw in another factor of 5 at least, corresponding to the hardware advantage of a CDC Cyber 176 over an IBM 370/168.

Since then Master's education has come on apace, including little things like recognising immediate mates "at a glance" instead of flogging the legal move generator through all possible variations and replies.

Most convincing of all is Master's recent coup in playing a human Expert under conditions amounting in effect to lightning chess from the machine's side, yet allowing the human the normal time for making his moves. To have achieved a draw under these conditions, which

limited Master to a fixed lookahead depth of five ply, could only have been done by marshalling very considerable reserves of chess knowledge, for at times during the game the human was plainly looking further ahead than the machine. Nick Jackson is known as a strong tactician and is graded about BCF 2100. Here is the game, with commentary by US National Master Danny Kopec:

WHITE Master
BLACK Nick Jackson
1. Nf3 d5
2. c4 d6

This is generally scorned as ceding the centre, but it will be interesting to see how White will recover the pawn. Computer programs are notorious for bringing out their Queen too early, and perhaps Jackson thinks he might get an early initiative by drawing out and attacking the White Queen after 3.Qa4Ch, though this is quite playable.

3. Nc3 a6
4. Nxc4 b5
White's grip on e5 is challenged since 5.N/c-e5, f6 6.Nd3, e5 is awkward for White.

5. Nc3 Bb7
6. g3 g6
This is all in Master's book repertoire.

7. Bg2 Bg7
8. d4 Nf6

9. 0-0 0-0
10. Nc2
The Knight on e3 is a funny piece. While being well-placed itself, it obstructs the QB, and the KP. The move played admits its awkwardness, and Black is already better thanks to his control of d5 and e4.

10. ... N/b-d7
Master keeps expecting ... e6, but this is an unnecessary weakening of the dark squares.

11. a4 e5
12. Bc3 Nd5
Black is even contesting White's control of d4. Pointless and weak. Bg5 is better.

13. Ng5f
13. ... Nxe3
14. fxe3 Bxg2
15. Kxg2 e5
16. Ne4 ed

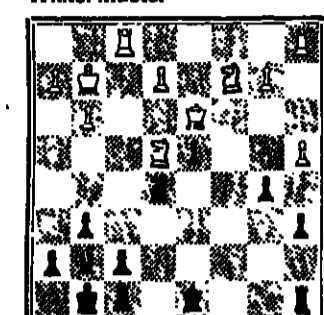
White had a horrible pawn structure and position. The move played is OK, but Qb6 is more poignant.

17. ed ed
18. Qd3

If 18.Nxd4, Nb6 and White's position is very loose. Master expected this move, though it is not best. Better is 18. ... Qb6, i.e. 19.e3, f5 20.Qb3Ch, Kh8 21.Ng5, Qb7Ch 22.Kg1, Nc5 etc. Also good is 18. ... Nc5! 19.Nxc5, Qd5Ch etc. (Qc7 or Qe7).

18. ... Nb5f?
19. Qxd4 Qxd4?
20. Nxd4 Nc4

White: Master



Black: Nick Jackson

Figure 1: Position after 18 ... Nb5f?

20 ... Ng4 wins and was expected by Master. Now White gets counter-play.

21. Nf6Ch Kh8
22. Rf4 R/f-d8
23. Nf3 Nxb2
24. ab ab
25. Rxa8 Rxa8
26. Ng5 Ra7
27. Nd5

27.N/fxh7 also works.

27. ... f5
28. Rh4 h5?
h6 is much less weakening.

29. Rb4 Rb7
30. Nf4 Rb6
31. Nd5 Rb7
32. Nf4 Bc3

The only winning try at this stage.

33. Rb3 b4
34. Nxc6Ch Kg7
35. Nf4 Rg7
36. h4 Kh6
37. Nd5?

White forces things too soon.

37. ... Rxc2Ch
38. Kf3 Rd2
39. Nxc3 Rd3Ch
40. Ke2 bxc3
41. Rb6Ch Kg7
42. Rb7Ch Kf6
43. Rb6Ch Kg7

Black should rush his King to the support of the passed pawn with 43. ... Ke5 if he wants to make a serious effort to win.

44. Nf3 c2
45. Rc6 Rxf3
Now the game is a clear draw.

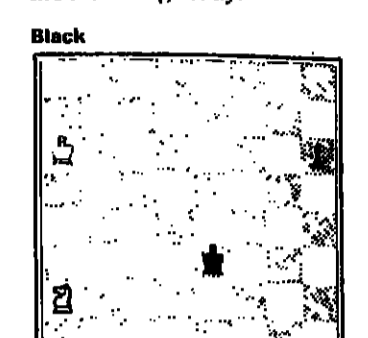
46. Kxf3 Nd3
47. Rxc2 Ne1Ch
48. Kf4 Nxc2
49. Kxf5 Nd4Ch
50. Kg5 Ne2
51. Kxh5 Nxc3Ch

And the game was drawn in a few moves.

We can assess this game by saying that neither side played well enough to win. Black made numerous errors in not exploiting White's poor middle game position.

Since the game ended up with only king, pawn, king and knight on the board it is pertinent to mention Grandmaster

Shamkovich, who recently visited this country. He has been tormenting his colleagues with the following study:



White

Figure 2: White to move and draw.

How on earth is the knight to get round so as to arrive at the right time and place to stop the enemy pawn? Shamkovich reports that Bobby Fischer solved it in under two minutes, but that all others have agonised for at least hours or days. Indeed one chess-playing friend of his has at the time of writing been hard at it for the past two months!

Computer Weekly readers, the ball is at your feet! Chesslab will pay a prize of £10 for the best solution received. "Best" will be adjudicated according to the completeness, persuasiveness, and (where appropriate) simplicity of the conceptual analysis accompanying a correct solution.

Commercial model added to Eclipse

A NEW commercial model at the bottom end of the Data General Eclipse minicomputer line has been added by the company in the US. Called the Eclipse C/150, it is based on the same processor as the S/150, small scientific machine, but excludes the specialised arithmetic features, replacing them with enhancements for efficient running of Cobol.

Priced at between \$75,000 and \$150,000 in the US, the C/150 is designed for both stand-alone working and as an element in a network.

At the other end of the range, Data General has doubled the main memory capacity of the powerful Eclipse M/600 to one megaword. The M/600, announced at the beginning of

year, incorporates a 32K-word Eclipse processor as the communications front-end (CW, January 26).

The Eclipse family now includes three commercial models, the C/150, C/330 and C/350, three scientific models, the S/130, S/230 and S/250, the array processor AP/130, and the multi-purpose large-scale timesharing M/600.

Data General claims that the M/600 is unrivalled in the large minicomputer market in that it can handle up to 64 simultaneous users, suggesting that among the competition, the HP-3000 from Hewlett-Packard cannot run so many jobs simultaneously and the DEC PDP-11/70 and VAX-11/780 and the largest Prime machines cannot

support so many users.

The AP/130 consists of an S/130 processor with an array processor back-end, both processors having direct memory access. It also incorporates additional microcode instructions and hardware for more efficient processing of arrays than is possible using Fortran.

The company also has a growing family of packaged "CS" systems for the OEM business systems builder.

There are two principal operating systems on the Eclipse line: the Nova RDOS and the new AOS timesharing, batch and real-time operating system. Languages available under AOS include Cobol, PL/1, Fortran IV and V, Basic, the IDEA transaction language and DG/L.

Scicon consultancy regrouping

A REORGANISATION of the Scicon consultancy and bureau group into three subsidiaries under a holding company has been announced. Aim of the reorganisation is to manage better the rapid growth of the company, wholly owned by British Petroleum. Group turnover for the current year is projected to reach £28 million, compared with £12 million in 1976.

The three companies are the Scicon Computer Services Ltd bureau, the German consultancy SCS Scientific Control Systems GmbH, and Scicon Consultancy International Ltd.

It is in the last-named that the main reorganisation has taken place. Its formation brings together nine subsidiaries which from time to time have operated

in 50 countries over the past 10 years. They are particularly active in Europe and the Middle East.

This newly-formed grouping is to be headed by L. B. Board as chairman and Julian Year as chief executive. Board is also chairman of the group holding company, while Year is a chartered accountant who has transferred from BP to manage Scicon's financial affairs. The new group expects a £12 million turnover this year.

Close behind comes the German company, projecting £11 million with one fifth coming from outside the Federal Republic, mainly in Austria, East Germany, the Soviet Union and Poland.

The bureau, running on Univac 1108s at Milton Keynes, projects a turnover of £3.5 million this year and is growing at an annual rate of 25%.

On the possible merger or acquisition of Scicon, Board says that any opportunities or offers will be considered carefully, adding that change will continue to be a major part of life at Scicon.

'Quiet enough for office'

A NEW version of Tally's T2000 line printer, that is claimed to be quiet enough for use in an office, has been introduced. It incorporates a heavy moulded cover of plastic foam that keeps the noise down to 60 DBa. Printing is by dot matrix at either 200 lines per minute (5 x 9 dot matrix) or 125 lpm (7 x 10 matrix). The 7 x 10 matrix is a new development to allow two descenders on lower case characters, and gives good enough definition for some word processing applications.

Merlyn Rees to address conference on privacy

A CONFERENCE on computers and privacy is to be held next January. Jointly organised by the National Council for Civil Liberties, the Institute of Data Processing Management, and the National Computing Centre.

Keynote speaker will be the Home Secretary, Merlyn Rees who will present the government's plans for privacy laws and its response to the Data Protection Committee's report.

The conference is intended basically to discuss the DPC report, and has had to be postponed several times owing to delays in completing the report. This is now ready and is due to be published in the next few weeks.

Venue for the meeting will be

the Rembrandt Hotel, Knightsbridge, on January 24 and 25.

Liberal leader David Steel will open the proceedings, and other participants will include Professor Alan Weston, Charles Read, and Paul Sieghart from the DPC, Kerstin Anor, Swedish Education Under-secretary, and possibly Christopher Layton from the European Commission.

The planned programme is in four sections: On the first morning, consideration of the Data Protection Committee report; on the first afternoon, four simultaneous workshops on cost, employment records, and the like; on the second morning, news of what is being done in other countries; and on the second afternoon, questions and answers.

IBM 3750 exchange linked to Univac 1100

A LINK developed by Triad Computing Systems of London enables Constructors John Brown to transfer details of telephone calls recorded on its IBM 3750 exchange to a Univac 1100 computer for detailed analysis. Calls related to engineering projects all over the

world can then be charged to the appropriate client. Triad claims this is the first time a 3750 has been linked to a Univac 1100. The same software will also be used for next time recording and analysis of data on other systems.

Tenth birthday surprise

LAST weekend, ICL was given an unusual tenth birthday surprise when the racing car it sponsors gained its first Formula 3 win.

Driver of the ICL car, New Zealander Rob Wilson, was first in the British Championship BP race at Mallory Park, on October 15, boosting his overall position in this series of races to fifth, with one to go at Thruxton on October 28. Wilson has already finished fourth in the Formula 3 Vauxhall series, which runs in parallel to the BP races.

Wilson told Computer Weekly he was "over the moon" at winning and that he was particularly pleased to have brought success to his ICL backers.

£4½m modem order

FURTHER orders for 12B modems worth £4½ million bring the total ordered from SE Labs by the Post Office to nearly £10 million. Developed for Datel 2412, the 12B is also suitable for the International Datel 2400 service.



Development systems offered on rental basis

DEVELOPMENT systems from Intel and Motorola are now being made available on a rental basis from Livingstone Hire, a company that has specialised in renting electronic instruments to industry. This is the company's first sally into the microcomputer business.

Aiming at the large potential market for short term usage of development systems in industry, and the large number of small companies that could not justify the capital investment involved in buying such

equipment, Livingstone is investing about £100,000 to provide the equipment on a rental basis.

Initially, only two systems will be available: the Intel MDS221, and the Motorola Exorcisor (pictured above). The systems will be available at between £800 and £1,800 a month, depending on configuration, and in-circuit emulators will be available for an extra £300 a month.

Full hardware and software support will be available through Livingstone.

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COMMERCIAL BUREAUX	moving into the remote job entry and telecommunications market.	
MANUFACTURERS OF TERMINALS	and their agents, who wish to avoid the capital commitments that offering their own rental service entails.	
LARGE COMPANIES	with a potential telecommunications network which would involve high capital expenditure on multiple terminals.	
ORGANISATIONS	such as educational establishments who commonly have revenue budgets rather than capital budgets.	
MINI COMPUTER USERS	who wish to limit their capital expenditure.	
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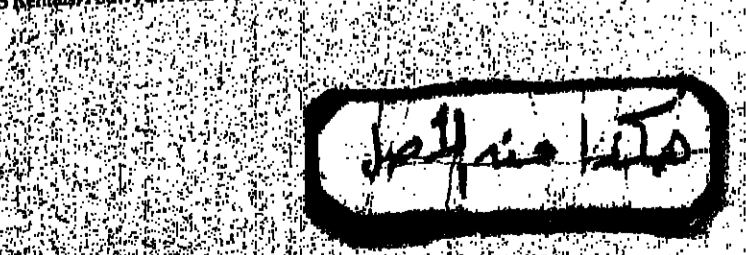
We offer flexible rental facilities on a wide range of equipment from leading manufacturers including Data Dynamics, Texas, Digital, Transdata, Diablo, Olivetti, Newbury Labs, Tektronix, Lear Siegler.

For more information contact Mike Brooke, Telephone BYFLEET 49511 & 49618

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How to create more jobs without inflation

By Geoffrey Beacon

THE desire to increase employment without inflation is motivated by the belief that increased leisure cannot be the complete solution to the unemployment problem which is being brought about by the combination of the limits to growth and improvements in labour productivity.

There are two main reasons for this belief. The first is that we still live in a work-oriented society. For the majority, achievement derives substantially from employment. The second reason is that leisure should not be forced on people, either by unemployment or short-time working, who could enjoy shorter periods of leisure a great deal more with the extra income that comes through employment.

In the UK approximately 90% of the cost in producing the gross domestic product is accounted for by wages and salaries, including income from self-employment, which in turn creates 90% of the national income.

As a first approximation, but quite a good one, we can ignore other forms of income such as rents, profits and transfer payments, and divide the working population of approximately 25 million into five groups of 5 millions each with earnings of £40, £80, £100 and £120 per week. (In fact the middle three-fifths of the working population earn slightly less and the top fifth slightly more.)

Although such large differences in income are deplorable, it is an unfortunate fact that unemployment exists mostly among the lower paid. This indicates that the wages of the group as a whole are higher than that necessary for full employment.

A rough estimate of current unemployment for each group is taken in Table 1. The reduced

percentages in the last column have 1.5% subtracted to account for that level of unemployment that is thought to be the irreducible minimum.

Sometimes right-wing economists will say that unemployment is caused by monopolistic factors in the labour market. They are clearly referring to those factors which keep the wages of the less well paid above the values necessary for full employment. Two examples of these monopolistic factors are unemployment benefit and the bargaining power of trade unions.

One advantage of labour subsidies is that there can be an increase in employment for the less well paid without a fall in their income. In our simplification of the economy, for this to be true, these labour subsidies must be paid for by taxes which fall largely on the more affluent. For the purposes of the calculation in this article the tax considered for raising the revenue will be VAT and the total labour subsidy paid will be set equal to the revenue raised.

VAT raises tax on goods and services proportional to their total cost. This in turn can be considered a tax on the factors used in producing the goods or services.

As an example for our simplified economy, Table 2 shows the first effect of raising an extra VAT just over 10% on all goods and services and using the money raised to subsidise labour on a per worker per week basis.

It can be seen from Table 2 that a policy of labour subsidies paid from expenditure tax applied to our simplified economy would decrease labour costs for the bottom end of the labour market and increase them at the top end.

This would have the effect of increasing the demand for labour and thus increasing

Table 4. The estimated effects of a blanket labour subsidy paid from VAT which creates 10% more jobs among the £40 per week group using a labour only model of the economy.

Elasticity of demand = 0.2 (Vat = 64.4%, labour subsidy = £44.8 per week, production rises 1.1% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	10	0	+2
60	+4.7	0	+2
80	+1.8	0	+2
100	0	-0.02	+2
120	0	-1.18	+1

Elasticity of demand = 0.5 (Vat = 19.7, labour subsidy = £16.5 per week, production rises 1.6% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+18
60	+2.3	0	+8
80	0	-6.69	-5
100	0	-19.58	-14
120	0	-32.47	-14

Elasticity of demand = 1.0 (Vat = 7.4%, labour subsidy = £7.4 per week, production rises 2.1% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+4
60	+3.8	0	+4
80	+0.8	0	+4
100	0	-3.14	+1
120	0	-7.08	-2

employment for the lower paid. For the better paid, the percentage increase in costs is much less than the decrease for the lower paid so the decrease in demand is likely to be small in comparison.

In any case this decrease in demand is more likely to manifest itself as a downward pressure on the wages of better paid rather than unemployment, because for them the 'monopolistic effect' of unemployment benefit is less. That is: they lose much more than the less well paid by being unemployed.

The extent to which a change in the cost of labour changes the demand for labour is described by the elasticity of demand for labour. At this stage of the argument its value is not a crucial factor because if the elasticity is low the desired level of employment can be created by choosing appropriately high levels of VAT and labour subsidy.

For later consideration, however, Table 3 gives the rates of VAT on the present model to produce 10% extra demand for the lower paid on the assumption of different values for the elasticity of demand for labour.

Depressing the level of wages of the better paid depresses the money value of national output so the rate of VAT must be somewhat higher than shown in Table 3 to pay for labour subsidies. Since, however, national output is not decreased the value of money is increased and those with the same money wage are better off.

Extra jobs do, of course, save public money, both in the form of reducing the expenditure on unemployment benefits and increasing tax receipts. Work by economists such as Santosh Mukherjee has shown that such savings are of the order of 90% of

an individual's working wage. A contributory factor to this seemingly high figure is that most of the unemployed are not high wage earners.

The sums involved, however, are so large that, if the elasticity of demand for labour were greater than about 1.1, labour subsidy schemes become self-financing — the subsidy paid being less than the savings in expenditure caused by a worker becoming employed.

Table 4 is calculated on the assumption that the elasticities of demand are the same for each group, that increased labour costs for the higher paid merely depress their wages and that decreased labour costs for the lower paid increases employment among them with subsequent savings in public expenditure, these savings being used to finance the labour subsidies. Since the elasticity of demand

RECENTLY several letters and articles in Computer Weekly have suggested a means of tackling the question of the effects of microelectronics on employment. That is: to introduce some financial mechanism to reduce the cost of labour as a factor of production. And by reducing its costs increase demand and create more jobs. This aspect of the debate has, however, been one-sided says Geoffrey Beacon, a research fellow at Leeds Polytechnic.

There has been no disputing the claim that such mechanisms could be effective, although there has been some discussion as to the relative merits of such mechanisms.

In the absence of any reaction it is perhaps worthwhile showing, with what Beacon says is an admittedly crude example, how one such mechanism, labour subsidies paid by expenditure taxes, might be used to reduce current levels of unemployment without causing inflation.

for labour gives an estimate of the labour cost at which the desired level of employment is reached, an estimate of the market's valuation of the extra labour employed can be obtained.

The value of this extra labour is the value of extra production and is shown in Table 4.

The change in standard of living shown for each group is due to a combination of this extra production and the deflationary effect of reducing the wages of the better paid.

The factors of production other than labour form only about 10% of the national income, after allowing for capital depreciation. These factors can broadly be put under the heading of capital.

The income that derives from capital includes such things as rent on land and buildings, not

profits from using plant and machinery and net income from the sale of minerals and other natural resources.

The effect of raising VAT to pay for labour subsidies would be to tax these other factor incomes (by taxing the end product and subsidising only the labour components).

Table 5 has been calculated on the assumption that income from capital is £200m per week and the even more arbitrary assumption that the elasticity of demand for capital is the same as the elasticity of demand for labour.

Crude though this calculation has been, it has shown at least the possibility of increasing employment without causing inflation — a possibility surely interesting enough to warrant further discussion.

Table 5. The estimated effects of a blanket labour subsidy paid from VAT which creates 10% more jobs among the £40 per week group using a model of the economy with elasticities of capital and labour set to the same value.

Elasticity of demand = 0.2 (VAT rate = x 46.2%, labour subsidy = £36.5 per week). Change in capital income = -8%. Production rises 1.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+8
60	+3.8	0	+8
80	+0.7	0	+8
100	0	-6.76	+0.5
120	0	-16.03	-7

Elasticity of demand = 0.5 (VAT rate = 15.7%, labour subsidy = £16.0 per week). Change in capital income = -8%. Production rises 1.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+3
60	+5.4	0	+3
80	+3.0	0	+3
100	+1.5	0	+3
120	+0.4	0	+3

Elasticity of demand = 1.0 (VAT rate = 4%, labour subsidy = £8.34 per week). Change in capital income = -5%. Production rises 2.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+3
60	+4.5	0	+3
80	+1.5	0	+3
100	0	-0.70	+2
120	0	-3.85	-0.1

Gas WP plans wait for the unions

● From front page
West Midlands Gas is Cyril Howarth, a well-known figure on the word processing scene. He wants to link the Wordplex 7 to an ICL mainframe and then to a COM recorder, thereby replacing carbon copies of letters entirely by microfilm. (Mainframes the gas board has at present are all ICL, a 2876, a 1904A, and a 1904S).

He also wants to be able to design and produce forms on the WP screens and then have them produced automatically on the phototypesetter. The ruling of both vertical and horizontal lines is seen as one of the major difficulties here.

Further in the future is a plan for electronic mail by communicating with word processors in gas board area offices via

an existing microwave radio link.

Technical difficulties abound in these plans, and it remains to be seen whether it will be Howarth or those who scoff at him who has the last laugh. Union problems are more immediate, however, as they are in several organisations contemplating WP. Other unions expressing concern are Apex

(CW, Sept 28) and CPSA (CW, Oct 12).

Manning levels, job satisfaction, and the grading of operators are the main preoccupations of the unions. Whether there can be any arguments over these matters is doubtful, as any system has a specific number of screens and that determines the number of operators needed.

System failure hits company

● From front page
defined manual accounting system at Credit and Commerce with which to run the computer system in parallel.

Auditors Price Waterhouse, said in the last Credit and Commerce annual report that they were unable to carry out all the

auditing procedures they considered necessary.

Credit and Commerce terminated its contract with Spang in July and has been operating a purely manual system since then. But the company has now ordered an ACR 8280 system which will be run in house.

Why one DPM is happy to 'put the clock back'

By Rosemary Pyne

WHEN the DP manager of a company maintains he has installed a teleprocessing monitor in order to "put the clock back", it's quite a thought.

But for David Edwards, DPM at Allied Industrial Services, this is exactly the way he views his use of Informatics' Minicom package, now Westinghouse's Westi. Because at AIS putting back the clock means restoring to the user departments the ease of access to and responsibility for the company's information which they had before any computers were installed.

A VDU-based TP system has in fact turned out to be more economic than a batch system. Apart from providing information directly to the user, as and when required, the screens have even offered price reductions. Before the screens were installed, AIS used to print the major files daily after updating, but now that they have gained confidence in the new system there is no necessity for the massive print.

In a single month the saving on the one-part and two-part stationery previously required pays the rental on a number of screens.

AIS application is not particularly unusual, but perhaps the methods used to solve the problem are.

AIS is one of the largest UK industrial laundry and dust control rental organisations. Since its establishment in 1864, the company has had its roots in Bradford, Yorkshire. And it's here at Ledge Green, Bradford, that AIS runs a 256K IBM 360/40 complete with nine 2314 disc drives, card reader and line printer and 13 FT 3280 VDUs.

But in March, 1976, when the company first considered tele-

processing, the machine was a modest 360/30 with only 64K memory. Current batch work, together with spooling, meant the ideal TP monitor would have to use only 20K of memory, including applications programs. As Edwards says, this meant AIS was obliged to buy Minicom, which was the only suitable size monitor on the market.

The original intention was to run a data entry system, putting

application could have been very awkward. "We saw we would all have to learn; the DP department as well as the users. So we decided to try a simple inquiry facility. It's lucky we weren't led astray by salesmen. What we set out to produce was a user system and not a DP extravaganza with lip-service being paid to the user side."

The inquiry application itself is larger than it appears. Screens are placed in the credit control, customer relations, general administration and cash offices. And there are plans for a screen in the distribution area. The number of transactions obviously varies, but Edwards reckons an average would be between 3,000 and 3,500 per day. However, AIS is expanding and these figures are expected to grow over the next financial year.

Further projects are also planned and the first data entry system has been scheduled for the summer of 1978. But Edwards stresses, his department has been very pleased with Minicom. "From the time we had the first screen in the office to having the application up and running live was six weeks. Yet everyone we spoke to maintained the programs would have to be written by TP experienced personnel. We simply haven't found this to be the case."

"Our main TP language is, and always has been, ANSI Cobol. We have no hesitation in utilising programmers trained in Cobol for writing our TP applications. In fact, many programmers have found TP programs easier to write than batch."

Unfortunately, the rising number of transactions is causing the 'software to, as Edwards puts it, "creak". "Primarily, this is because

prime data on file through the original five IBM 3270 VDUs. This was an attractive idea because it meant existing data preparation equipment, IBM card punch units, would be obviated and a function would be reduced."

Edwards now sees that to go straight to a data preparation

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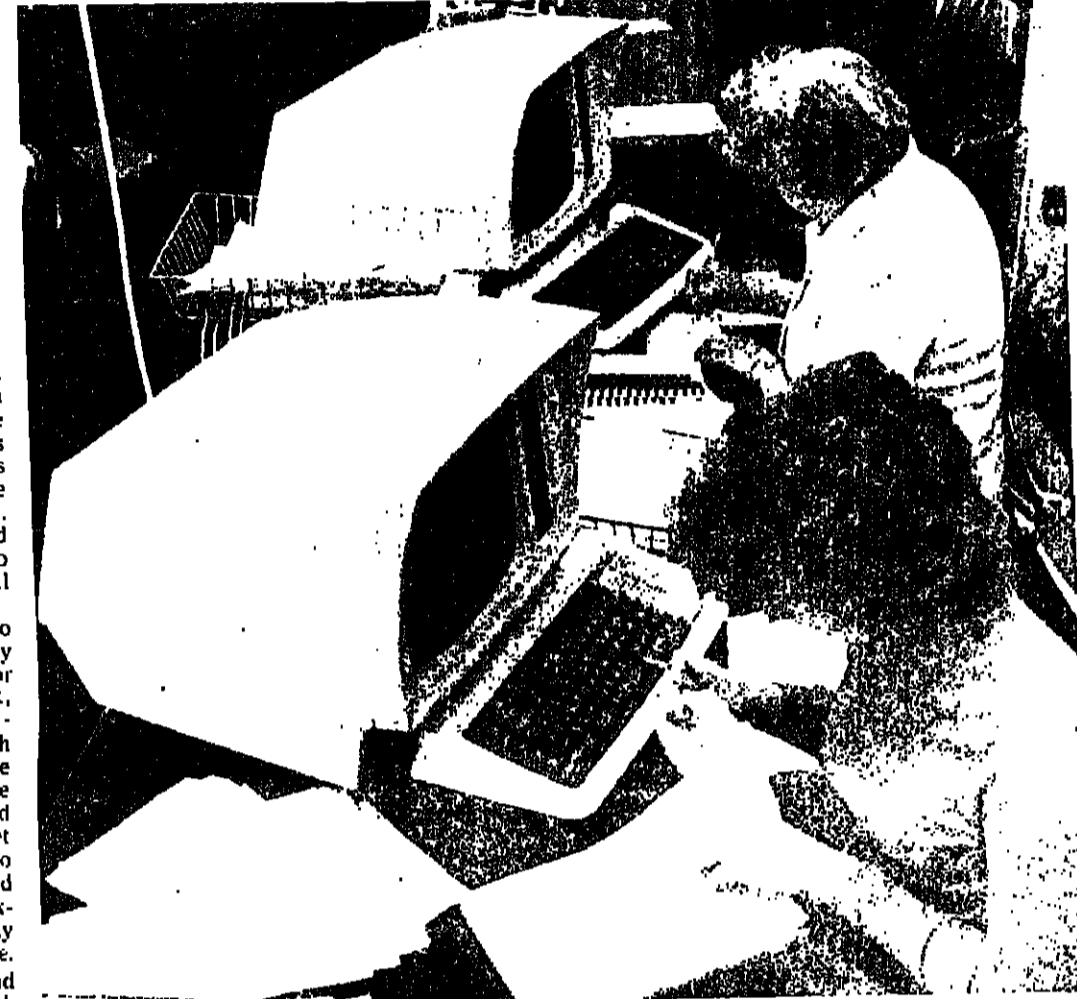
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VDUs are located in several user departments and new applications are being studied.

Minicom is single thread. Even so our users may have noticed no degradation yet, but we have. One point has now become obvious: because Minicom exploits single-thread to the full, it's easy to use. But with multi-threading, we have to accept a more complex product and application programs. We initially set out to find something better than Minicom but with more than one task currently active, and, to be fair, we couldn't find it."

"Now with an increasing number of screens, currently 13 and due to rise to 18, the possibilities of operators hitting any one of the SEND keys concurrently are becoming greater and the response time is becoming adversely affected. Statistically the more screens, the worse the position becomes. Westi stayed us, because with the other TP monitors we examined the suppliers said we would have to have staff on-site for so many days to help us use it. They all told us how we should design our system, whereas what we really wanted to know was how their TP monitor would fit in with our design."

"With Westi we simply used the manuals and had a free trial period. We didn't want the implied interference the other suppliers offered. We pride ourselves on being essentially a service company, so we need to be able to react quickly and stand on our own two feet without having to rely on any TP company. I can't understand the great need for support, in my view, if you need support, you don't want the package. On the other hand if we do need the aid of help, providing the support can be had over the telephone."

David Edwards, DPM at Allied Industrial Services, maintains he has installed a teleprocessing monitor in order to "put the clock back." He views his use of Informatics' Minicom package, now Westinghouse's Westi, as a means of restoring to the user departments, the ease of access to and responsibility for the company's information which they had before any computers were installed. Rosemary Pyne, who met and talked to Edwards, describes here the reasons which led to the decision for installing the package and also the

benefits which have accrued since then.

The VDU-based system has in fact turned out to be more economic than a batch system, and apart from providing information directly to the user as and when required, the screens have even offered price reductions. In a single month the savings on the one-part and two-part stationery, previously required, pay the rental on a number of screens.

Rosemary Pyne adds that AIS' application is not particularly unusual, but perhaps the methods used to solve the problem are.

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SPOT
LIGHT
ON

BANKING AND INSURANCE

Cash in on your special skills

THE banking and insurance industries are dominated by a number of very big companies that prefer to acquire their computer staff by recruiting school-leavers and graduates and putting them through well organised internal training schemes rather than hiring experienced DP professionals.

In addition, the security of employment offered by banks and insurance companies and the collection of perks that often go with the job mean that their staff turnover is low compared with other sectors of commerce and industry.

But there undoubtedly are openings for the right sort of experienced systems, programming and operations people in banking and insurance, especially if they satisfy a particular need.

For example, one major bank actively seeking experienced personnel at the moment is the Midland, which is prepared to pay juniors of 18/19 years old between £3,500 and £4,500 a year to work as operators at its computer output microfilm bureau in London, provided they have at least six months' experience working with some kind of computer equipment, not necessarily COM.

The Midland is also looking for experienced systems analysts to be based at Sheffield where most of its systems and programming staff are located these days.

A lot of the 250 staff there moved up to Sheffield from London and the Midland says that the vast majority of them were prepared to make the move because of the financial incentives they were offered.

Most of them would not consider moving back to London, according to the Midland, now that they have experienced the advantages of provincial life, like being able to drive to work instead of commuting up to the City on crowded trains.

The Midland likes the Sheffield area so much that it is now moving the head office and DP centre of Midland Bank International up to nearby Barnsley from Gracechurch Street in the City. The operation will be housed at an impressive new centre that should be completed by 1980 and will employ about 300 staff, many of them recruited locally.

Barclays is another major bank that prefers provincial life. Most of its systems and programming staff have

been based at Knutsford in leafy Cheshire for the last two years. The bank's two main London computer centres at Harlesden and Tottenham Court Road will be relocated to a new site at Gloucester by the middle of next year.

Some of operations staff from the two London centres are not keen about making the move and a number have left the bank already for that reason, so Barclays is now recruiting trainee operators in the Gloucester area.

Lloyds Bank is taking the opposite approach to Barclays and the Midland by concentrating most of its computer power in central London at Bankside, just over the Thames from St Paul's Cathedral.

Another difference between Lloyds and Barclays is that the former maintains salary scales for its DP staff that are related to the scales for the rest of its workforce, while at Barclays, DP staff not only have their own separate salary scales but programmers and analysts have a scale different from operators.

However, the market value of programmers and analysts has persuaded Lloyds to pay them what is called a "technical allo-

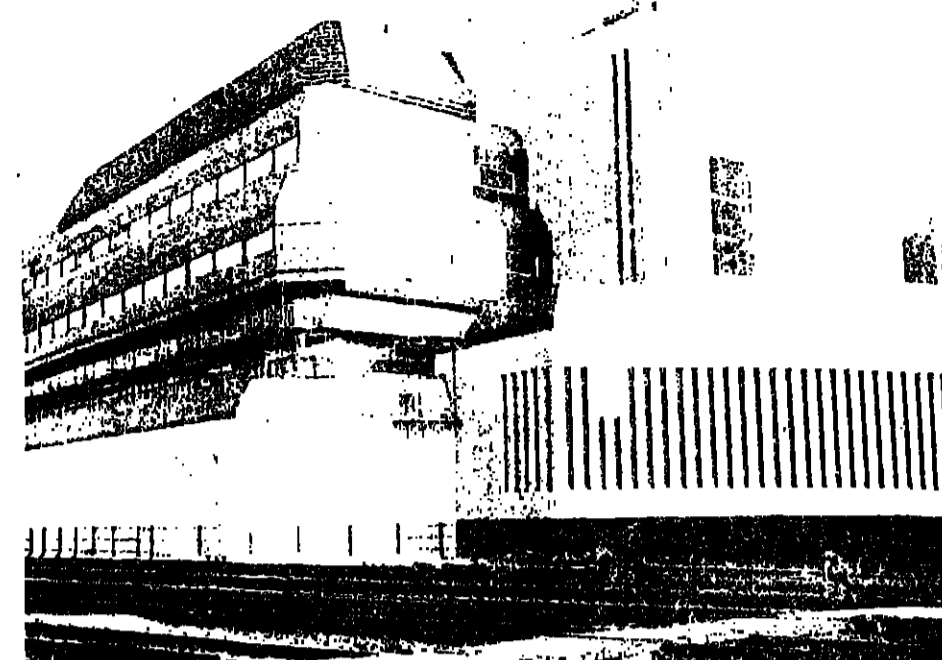
wance" on top of their basic salary and the bank is understood to be seriously considering introducing separate salary scales for its DP staff.

Lloyds does not pay the technical allowance to its operators, an indication possibly of the relative decline in demand for operators among banks and big computer users in general now that DP workloads are tending to be concentrated on one or two very big systems. Instead of several medium sized configurations and applications are being converted more and more from batch to online processing.

One of the country's best known insurance companies, Prudential, for example, says that it has already had to move about a dozen of its operators over to programming because its line-up of mainframes has changed from six medium sized machines to two big ones — dual 370/158s.

The Prudential adds that the fall-off in its requirement for operators is now so substantial that any new operators that still need to be recruited must pass a programming aptitude test.

The Prudential maintains separate salary scales for its DP staff to make sure,



Lloyds Bank new centre, across the Thames from the City, where most of the bank's computer power is located.

according to the company, that their salaries are in the upper quartile of the current market rates.

The Prudential points out that it does not lose more than 10% of its DP staff in any one year and that the percentage was considerably lower than 10% in 1978.

At the same time the company does not take on many experienced staff from outside because it finds that they tend to want something like £1,000 more than they are being paid in their existing job to do the same sort of work.

The Prudential prefers to recruit and train its own staff from "A" level school-leavers and university

graduates, as does Royal Insurance, whose DP staff are nearly all located in Liverpool. The Royal operates an IBM 3033 there which forms the centre of a terminal network providing online claims processing facilities for its 260 branches.

The attitude of the National Union of Bank Employees towards remuneration in the industry is one of extreme discontent with the way that the government's pay policy forces banks and big companies, to toe the line while a lot of smaller employers can get away with paying their DP staff more than the agreed limit.

The banks have a particular problem at the moment because they award across-the-board pay rises in July each year — the back end of the existing government pay cycle which runs from August to August — so their employees have to wait 11 months before they can catch up with whatever percentage rise has been agreed for that cycle.

According to NUBE, programming staff are especially annoyed if their bank is forced to employ a contract programmer for a fee that is far higher than the salaries paid to full-time personnel.

SPOT
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BANKING AND INSURANCE

Systems Analyst

ready for development

The Provident Life Association is a medium sized Life Assurance Company in the City, just opposite Liverpool Street Station. We have subsidiary companies dealing with motor and general insurance and are well established and highly respected organisation. Systems Development plays an important role within our company and it is for this section that we are currently looking for an experienced Systems Analyst.

We operate a 1902T installation and the person appointed can expect involvement in a challenging range of development projects.

Applicants will need at least two years' good commercial experience as a Systems Analyst and should be able to demonstrate initiative, imagination and a high degree of professional expertise.

We offer a salary of up to £6,000 with a wide range of generous benefits that include:

- Mortgage scheme
- 34 hour flexible working week
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PROVIDENT LIFE
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Opportunities in Banking for experienced

Analysts & Programmers

£7,000 — £8,500 + home loan scheme

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The main equipment comprises a 158AP and 3031 supporting MVS, VTAM, TCAM and TSO with a country-wide TP network of over 400 terminals. A second network supports 140 VDUs, printers and SWIFT. New terminals have been ordered to replace the first network. A 3850 and COM have recently been installed. PL/1 and BAL are the main languages.

If you are aged 27 to 32 with a good degree or equivalent professional qualification, at least 6 years' project experience and would like to join us in offices adjacent to London Bridge Station please telephone Jean Brown on 01-407 3121 ext. 203/204 for an application form or write to B. H. Ballis, Head of Computer Development, Williams & Glyn's Bank Ltd., New London Bridge House, 25 London Bridge Street, London SE1 9SX.

WILLIAMS & GLYN'S BANK



Bank of New South Wales

The following computer personnel are required for our IBM 370/115 installed in our office at 9 Backville Street, London, W1A. The configuration handles a number of financial applications for our London operations including an on-line system for foreign exchange.

SENIOR PROGRAMMER

Salary circa £6,000
A Senior Programmer is required with experience of IBM COBOL to be responsible for a small group of programmers.

PROGRAMMER/ANALYST

Salary circa £6,000
With good COBOL programming experience in an IBM installation who desires to progress further into systems analysis.

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Salary circa £5,500
We are looking for a Programmer with 1-2 years' experience of COBOL preferably in a financial environment.

SALARIES SUBJECT TO EXPERIENCE

The Bank is Australia's largest trading bank. The size of our operation in London, allows us to give our people a friendly place of work, with the flexibility to allow the use of initiative with responsibility.

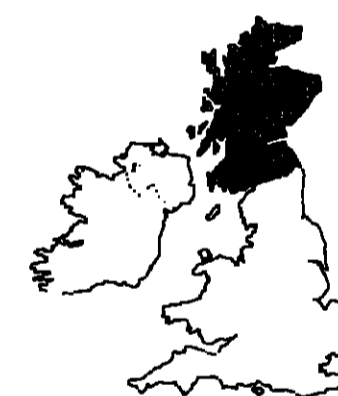
4 weeks' leave a year and after a settling in period, the kind of fringe benefits you would expect from a major financial institution, low interest loans, luncheon room, contributory pension arrangement, medical insurance, season ticket loans etc.

Applicants should contact John Halliday on 01-437 9711 Ext. 217.



Bank of New South Wales
(Incorporated in Australia with limited liability)
9 Backville Street, London W1A 2AB

SCOTTISH RECRUITMENT FEATURE



Advertisers are reminded that the next Computer Weekly area feature will be published on October 26 and will highlight career opportunities in Scotland.

Space reservation should be made as soon as possible.

Owen Kelly — Manchester — 061-872-4211
Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

COMPUTER WEEKLY
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Ring Eddie Farrell or Mark Williams on 01-261 8028 01-261 8019

BANKING AND INSURANCE OPPORTUNITIES

ANALYST PROGRAMMER—CITY TO £8,500 + SUB MORTGAGE

Are you DYNAMIC, SMART, INTELLIGENT? If so, we have the perfect job for you! All the responsibility you can handle in this fast growing stimulating department, promotion to D P M within short time is very likely. Ideal applicant will have a good educational background and several years' data processing experience with at least 3 years' BASIC on any mini, systems experience would be a great advantage. This is a very interesting position working closely with the users in a fast moving environment.

* FANTASTIC perks which include subsidised restaurant and full banking facilities, season ticket loan scheme

Ref. 1803

SYSTEMS ANALYST HANTS. £7,000 +

Newly-created openings exist within expanding D P. services division of major British insurance group. Retaining IBM 370, they seek Systems Analysts, preferably with a good programming background, able to successfully implement medium to large systems and able to communicate at all levels — to play an important role on their major systems. Co. offers:

- * Good career path
- * Fast hours
- * Annual bonus
- * Relocation assistance

Ref. 1870

ANALYST PROGRAMMER CITY TO £6,500

Long established international bank is seeking to recruit experienced COBOL programmer to join team shortly to work on a complete re-write of its accounting system following a review of its hardware requirement which will lead to the acquisition of a sophisticated mini-computer system. Successful applicant should have 2-3 years' experience of COBOL in financial area, with NEAT 3 in grant access. Company offers:

- * Mortgage assistance (dep. on status)
- * Non-contributory pension and life assurance
- * BUPA
- * LVs £4.00 p.w.

Ref. 1847

PROGRAMMER CITY TO £5,500 + SUB MORTGAGE

Progressive multi-national bank, based in the City, has a vacancy for a programmer. They want an IBM hardware and software expert with at least 2 years' experience of COBOL and preferably some ASSEMBLER. The company offers excellent promotional prospects and will offer training in COBOL. This is a superb opportunity for young programmer to join highly reputable organisation and to progress in an excellent career path.

Ref. 1878

PROGRAMMER CITY & MIDD. £5,000 NEG + SUB MORTGAGE

Our client leading bankers, require programmer with at least 18 months' experience in RPGII. Applicant will join a young and enthusiastic data processing team which retains IBM system 3 hardware. Major enhancements are planned to keep pace with company's rapid growth. Applications will be of financial nature and company offers good promotional prospects.

* Excellent fringe benefits which include banking and credit facilities profit share and non-contributory life assurance and pension scheme and BONUS.

Ref. 1828

JUNIOR SYSTEMS ANALYST LONDON TO £6,500 + SUB MORTGAGE

Major British insurance company with assets exceeding £440m seeks persons with minimum 12 months' experience of systems analysis and design covering major aspects of systems work, preferably with an ICL COBOL programming background. Company has well planned future including delivery of ICL 2860 computer next year running under VME/B and covering projected development work.

* Excellent early promotional prospects.
* Full 200% training.
* FANTASTIC perks which include Flexi Hours, Season ticket loan, free lunch, bonus and annual review.

Ref. 1849

ICL PROGRAMMERS CITY TO £5,500

An exciting opportunity for ICL COBOL programmers with proven track record to move into a challenging and rewarding role. The company is a prestige British banking organisation currently retaining ICL 1900 but with a 2860 scheduled for delivery mid 1979. The position will initially be involved in the continuing development of an existing commercial project to be followed by all new development work on 2860. Company offers:

- * SUBSIDISED MORTGAGE.
- * 32% hour week.
- * Non-contributory pension, free BUPA and life assurance.
- * Season ticket scheme, 50p LVs daily.

Ref. 1886

SYSTEMS ANALYST N. LONDON TO £8,000

Prestige organisation providing services to the British banking industry requires Systems Analyst to become involved in the implementation and continuing development of large on-line communications based systems. Ideal candidate should ideally have had a programming background, experience of working in operating system environment with a T.P. bias and able to play a major role in the design and implementation of an on-line transaction processing system. Experience of ICL hardware a distinct advantage. Company offers:

- * Mortgage subsidy
- * Non-contributory pension
- * Personal loan scheme
- * RELOCATION expenses

Ref. 1888

PLEASE REPLY:

KNIGHT PROGRAMMING SUPPORT LIMITED

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- * new computer
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- * new development work

Our recently established Computer Services Department is now seeking to recruit additional programmers to meet a demanding future workload.

The department uses a Hewlett-Packard HP3000 with 256KB memory and 50MB disc storage, supporting VDUs, printing terminals and a trans-Atlantic communication link to Toronto. All program development is on-line and current considerations include the possible use of a Database Management System.

We are looking for two programmers seeking to develop their careers in a professional and up-to-date environment. One opening is suitable for a person at the early stages of his/her career; the other for someone more senior, who could expect his/her earnings to be towards the top end of the quoted range. In each case, ability and commitment are the prime requirements. COBOL experience is preferred but training will be given where necessary.

We will provide successful applicants with the opportunity to develop rapidly and become fully involved, and will support experience with training as required.

We offer excellent working conditions and a benefits package normal for the financial sector.

Apply to: Mr. S. H. Martin, Personnel Manager
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MYRIAD

SALES EXECUTIVES FOR FINANCIAL SYSTEMS CENTRAL LONDON c.£10,000

Tymshare is the fastest growing time sharing bureau in the U.K. and is a subsidiary of a leading U.S. Bureau specialising in the solution of complex financial problems. The company market a range of powerful financial application systems aimed at giving senior management direct access to accurate up-to-the-minute information making the vital decision process a quicker and surer one.

Tymshare entered the market place in 1966 and have grown to a company of over 2,500 personnel, running approximately 60 mainframes with a turnover of \$150 million. The company have sales and service offices throughout America, the United Kingdom, Western Europe and Japan. They have developed advanced application software and a communication system TYMNET which ranks as the most proven network in the commercial computer services business.

Tymshare have been operating in the U.K. for a little over four years and have already achieved an enviable track record having the fastest growth of any Tymshare subsidiary. To continue this pattern several senior financial marketing personnel are required to augment a busy team operating in Central London.

Applicants should have a strong financial background with ideally sales experience gained in a bureau or systems house environment; additionally applications from candidates with formal accountancy qualifications and a desire to enter a client oriented environment will be given serious consideration. Due to the unique nature of the systems involved, extensive training in the company's financial products is envisaged. Successful candidates will receive an excellent base salary, with potential to achieve earnings well in excess of £10,000 together with generous lease car arrangements and excellent career progression.

To discuss the company and these vacancies in greater detail contact Tymshare's Consultants.

FREELANCE ANALYSTS and PROGRAMMERS

ARE YOU SEEKING AN OPPORTUNITY TO JOIN A SMALL PROFESSIONAL COMPANY (IN A PERMANENT ROLE) WITHOUT TAKING A DROP IN SALARY?

If you have been successfully as a contract Analyst or Programmer for some while you are now probably considering your next move. Normally to enter the mainstream of commercial employment can mean a dramatic reduction of the high salary you are currently earning (c. £9000)

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Myriad commenced operations in 1974 and over the last four years has doubled in turnover and size each year; to maintain this momentum requires not only skill and determination in its management but also in each member of the team.

If you feel you may be the person for whom we are looking please telephone to arrange a meeting to discuss the vacancy in detail.

Based in Fleet Street

First Year c £9000

Ref. AW/1910

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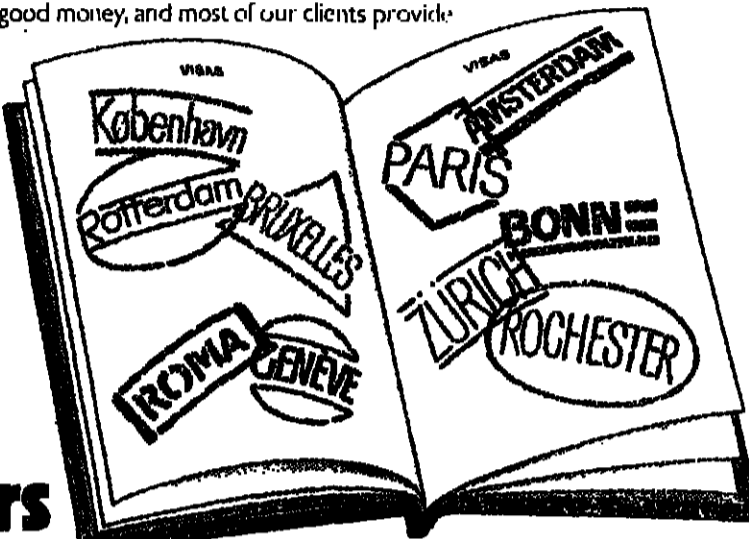
Or in your own area of the UK.

It all depends on what you're looking for next, and what your experience proves you can handle.

If you work abroad, you'll earn good money, and most of our clients provide free return flights and other expenses.

If you stay in the UK we can assure you of a high salary and valuable experience that will put another piece in the jigsaw of your career.

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For further details or advice on these or other U.K. and European Contracts, call Sue Smyth, June Mogg or Jane Asbury, NOW on 01-491 4706 or 01-439 3411.

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2970/80 FORTRAN+
ASSEMBLER - Germany
IDMS ANALYST/PROG. -
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Please contact Richard Kaluzynski or Sue Gillam: 01-491 4706 or 01-439 3411
All vacancies are open to both male and female applicants.



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The work is highly varied and interesting. If you have broad experience which includes some of the following:

- Minicomputer hardware/peripherals - Analogue interfacing
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Seicon can offer a challenging career and an environment where initiative and commitment are encouraged and rewarded. Good starting salaries and excellent conditions of employment also apply. Contact: Margaret Stevens

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London up to £8,000
Our client, one of the largest software houses in Europe, has opportunities for professional staff to join an expanding consultancy team. The work includes advising clients on systems development, design and implementation of medium to large application and project management.
Candidates should have at least five years experience in the design of commercial applications, particularly where real-time or database techniques have been used. A proven background of project leadership is obviously an advantage.
Salary negotiable according to experience. Excellent career prospects. Relocation assistance available. Contact: Jim Baker

EUROPE

JBA is introducing a new service dedicated to d.p. professionals who seek to enhance their experience by considering medium to long term assignments in Europe. This means that we now offer you our established consultancy service in this area. Further, we offer assistance in selecting, from a number of possibilities, the assignment that ideally matches your geographic and type-of-employment preferences (staff contract, freelance or permanent employment).

JBA will soon be featuring in the computer press a selection of superb vacancies in Europe - watch out for it. If you don't see the job that appeals to you, we'd still like to hear from you. Whatever your experience, we can advise on the likelihood of getting a job - where, for how long, and the level of salary you could expect.
Contact: Mike Creamer or Andy Wright

For further information on any of the above vacancies please contact the appropriate consultant.

If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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16 Maddox Street, London W1. Tel: 01-491 4478

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As a result of the continued expansion of their traffic control business in both home and overseas markets, our client requires Systems Designers and Software Engineers with previous design experience using any of the following: PDP11, RSX11M, CORAL, MACRO, ASSEMBLER.

Only candidates who are looking for a challenging and demanding job with good career prospects should apply.

The Company is based in one of the most attractive parts of the country with coastal leisure activities and moderately priced housing.

Salaries will be negotiated in line with qualifications and experience, and a very generous relocation package is available.

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Instrumentation Project Manager

Manchester up to £8,000
Our client, a leader in process control systems, wishes to appoint a Project Manager to take responsibility for all instrumentation in their range of industrial automation projects.
Applicants should have a formal qualification in electronics or a related subject, together with a sound background in computer control systems. Experience of project management is obviously essential.
This is a opportunity to join a professional team. Salary is negotiable according to experience. Contact: Jim Baker

COBOL Programmers

Surrey Start to £8,900 + BUPA
Specialising in the provision of conversion services to installations changing or upgrading their hardware, this company requires good COBOL programmers to help them stay on top of the most up-to-date computer technology.
Their Richmond headquarters services both Europe and UK, so after initial training you could find yourself spending short periods abroad - SUPPORTED BY GENEROUS TAX FREE ALLOWANCES ON TOP OF YOUR SALARY. If you enjoy programming, would welcome the chance of travel and variety, and relish the idea of keeping constantly in touch with modern equipment and ideas, you may fit in to this challenging and uniting environment.
First class training and promotion opportunities, relocation expenses and free life and health insurance, are some of the substantial benefits available with this company. Contact: Andy Wright

Basic + Programmers

London SE1 start c £5,500
Due to our client's continued success in providing bureau services and turnkey systems to the legal and professional world, their Development Department now has two further vacancies for programmers with at least 18 months BASIC or BASIC + experience. Applicants should preferably have a PDP11 and RSTS/E background.
The group is responsible for software development and technical support both to the company and its clients, and plans for the immediate future include developing applications for various MICROS and as well as for the PDP11's already on-site.
Superb promotion opportunities to Systems Analysis and Project Management - possibly within a year of joining for the most able. Profit sharing scheme, free Life Insurance also available. Contact: Andy Wright

High Technology in the Peak District

In the middle of the beautiful Peak District there are interesting opportunities in the field of high technology. Derbyshire County Council has a computer division responsible for many areas of the County's work.

The Council's decision to increase the numbers of development staff in readiness for the delivery of an IBM 3031 processor has resulted in the following openings:

Team Leader-Technical Applications

Salary scale £5,822 rising to £10,714 (inclusive of supplement)
This is a newly created post within an expanding group responsible for the development and maintenance of applications for the three technical departments - highways, planning and architecture. Current work involves the use of a remote job entry network, a graphics terminal, a digitizer, a flat bed plotter and a Prime 300 mini computer.

Applicants should have a thorough knowledge of FORTRAN and at least four years' experience in computing. Experience with IBM equipment using BASIC ASSEMBLER or PL/I and of any of the technical disciplines mentioned above would be an advantage.

Systems Analyst/Programmers

Salary scale £4,773 rising to £7,568 (inclusive of supplement)
Located in both the technical applications group (see above) and the main development group dealing with financial and administrative systems, these posts allow the opportunity to deal directly with computer users and to assume project responsibility under the control of a team leader.

As part of an expanding, though flexible organisation, successful candidates can expect to work on a variety of applications and to be involved in analysis, design and programming work, including the supervision of other staff.

Senior Programmers

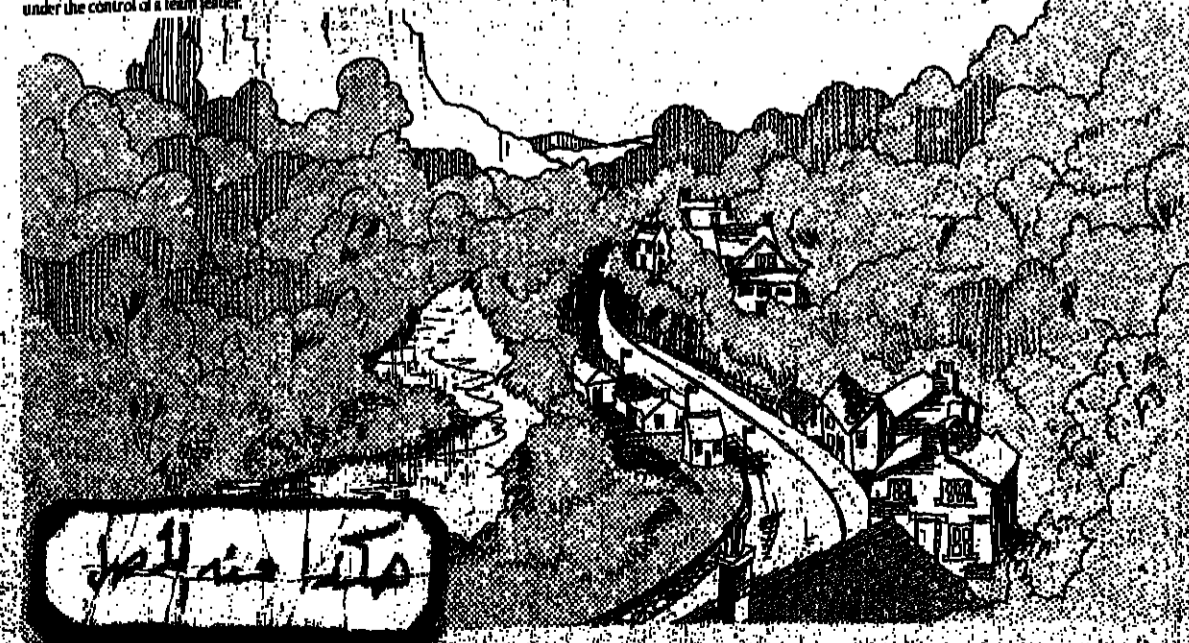
Salary scale £3,732 rising to £5,517 (inclusive of supplement)
These are also located in both the technical applications and main development groups. The work involves a variety of applications and there is an opportunity to gain experience of systems analysis and design.

All applicants must have two to three years' experience in computing, including work on IBM equipment. Knowledge of FORTRAN is essential for work on technical applications and a knowledge of PL/I would be most useful.

You will be based in the attractive town of Matlock which has Derby, Nottingham and Sheffield within easy reach. There is a scheme in operation for the payment of lodging and removal allowances to householders.

For further details and application forms please write to: The County Treasurer, P.O. Box 2, County Offices, Matlock, Derbyshire, DE4 3AH

DERBYSHIRE
County Council



WEST MIDLANDS COUNTY COUNCIL

WEST MIDLANDS POLICE MANAGEMENT SERVICES LLOYD HOUSE SYSTEMS ANALYST

£5727 - £8080. Applicants should have a relevant university or professional qualification and a minimum of 3 years experience in computing with at least two years in systems design. Duties include feasibility studies on proposed new applications, investigation/analysis/demonstration systems and advice on future requirements.

SALARY QUOTED INCLUDES SUPPLEMENT PAYMENTS.

For further details and an application form write or telephone quoting post reference POL 226 to the Personnel Officer, West Midlands County Council, 1, Lancaster Circus, Queensway, Birmingham B4 7DU. Telephone 021 300 7824. A telephone answering service operates out of office hours. Return applications by 31st October, 1978.

Systems Engineer

£6000+

Atkins On-Line, are one of the fastest growing and consistently profitable time sharing and batch processing bureaux in the business, with a network extending throughout the UK, USA, Canada and Holland.

We are shortly taking delivery of new DEC-10 computers at our Epsom head office and are seeking an additional Systems Engineer, male or female to assist with the maintenance of this equipment and existing hardware in locations throughout the country.

This is an excellent opportunity for engineers already in customer servicing who wish to consolidate their skills and enter new areas of opportunity. Experience of PDP11 and peripherals would be an asset.

We offer an attractive starting salary, car allowance and comprehensive on-job training where necessary, plus excellent working conditions and benefits, including generous relocation expenses if applicable.

For further details, please contact
Helen Hackett,
Personnel Manager,
Atkins On-Line,
Fourmoat House, 12-22 West Street,
Epsom, Surrey.
Tel Epsom 29678.

**Atkins
On-Line**

Systems Assistant

Salary rising to £3,900

We are looking for someone to work closely with our Systems Coordinator in the further development of our computer based accountancy and management information systems.

Duties will include the monitoring of computer input and output, liaison between the computer department and users, together with ensuring full implementation of developed systems.

Applicants for this post should have a good standard of general education with at least 'O' level Mathematics and English (or equivalent) together with an analytical and enquiring mind, and preferably a broad based experience in computerised accountancy procedures in a large company environment.

For further details please contact:
Staff Dept., Pickfords Removals Limited
400 Great Cambridge Road, Enfield, Middlesex
Tel. 01-366 1211 Ext. 439

Pickfords

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One of the major UK breweries have recently ordered two ICL 2960's. These will be installed early next year and will replace the current hardware of two ICL 1903T's running under GEORGE 2S.

As one would expect from a major brewery conditions of employment are first class and include:

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Three operators with upwards of one year's operating experience on ICL 1900 mainframes, running under GEORGE 2, are required to complete the existing operations team. Three shifts are worked and with the arrival of the 2960's in the near future, prospects for career advancement are excellent.

For further information (including a data sheet describing our clients installation) contact our CROYDON office quoting ref: CW 42-8S.

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Terminal Supervisor

Salary: Grade A.P.5 (£4773-£5073)

The Council has a terminal link with an I.C.L. 1903T computer belonging to the Somerset County Council, established by means of its own C.M.C. 5/80 terminal plus other support equipment.

The successful applicant will be responsible to the Finance Officer for (1) control of the terminal and its staff (2) advising on the application and updating of computer systems, and (3) liaising with the Somerset County Council.

Previous computer experience is essential and experience with the particular equipment mentioned above is desirable.

Housing accommodation may be provided, full removal expenses, £100 towards out-of-pocket expenses and assistance with salaries and out-of-pocket expenses paid in appropriate cases.

Application forms and further details can be obtained from the Personnel and Management Services Officer, Taunton Deane Borough Council, Municipal Buildings, Taunton, Somerset, TA1 4AG, telephone Taunton 86108 ext 33. Closing date Wednesday 26th October, 1978.

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Required to work on the development of software for a Micro 16 based switching system acting as a front end to an ICL 1904A computer.
AP5/SO1 £5058-£5853 inclusive.

SENIOR PROGRAMMER Data Processing Centre

The programmer should have experience of business or administrative systems and COBOL programming. Knowledge of FORTRAN an advantage. Duties include the provision of programming services on data processing and management systems. Such development and modification of packages involved. Online systems are in use.
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To assist on the Computer Science course and in the development of the system based on the ALPHA mini computer. Experience with digital electronic circuits an advantage.
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Shift Leader £6,300 inc.

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Successful candidates should have a minimum of five years' experience operating an IBM 370 under DOS/VS.

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we have at Feltham, a recently installed 2970 running under VME B; 2 x 1904S, a 1904A and a 1902T using George 2 and 3, with MAXIMOP and a large communications network, utilising front-end processors. *How's that for an installation?*

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Dorset County Council
County Treasurer's Department

NEW ICL 2976 INSTALLATION

PROGRAMMERS

Salary £3279 to £4832 (inclusive of super-lament).

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Applicants should have received basic training in programming and have gained at least one year's practical COBOL programming experience. Knowledge of 2900 computers is an advantage but not essential as any necessary training will be given.

Applications forms returnable by 2 November 1978 and further details from: County Treasurer, County Hall, Dorchester DT1 1XN. Telephone: Dorchester 913 Ext. 4114. Please quote reference TR(C)2/78.

Technical Support Staff

Rural Staffordshire

Our Operations Planning and Software Sections are looking for additional technical staff to complete their teams based at Burton-on-Trent.

Installation

Our current equipment is based around twin IBM 370/155's (under MVT/HASP/TSO) and a 370/148 with a nationwide TP network of 3270's under CICS. A 3032 is due in 1979 together with a mass storage system and will be run under MVS, with VSPC. Amongst other developments are the introduction of Distributed Processing using Series 1 minis, Database Systems, TSO and Personal Computing, and both Hardware and Software monitors for Performance Evaluation.

Operations Planning

The function provides general technical support and ensures the efficient use of operations resources covering hardware and procedural evaluation and implementation. We are looking for people with an in-depth knowledge of IBM 370 operating systems preferably with a systems programming background who have a practical knowledge of job control language and an understanding of operational practices.

Operations Software

This section provides a service to ensure the successful performance and availability of software and will involve the design, testing and implementation of in-house operating software. Here we need systems programmers with IBM Software experience in one or more of the above computing techniques. Above all applicants must be problem solvers, with the enthusiasm to develop their skills.



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Chris Scott, Personnel Officer,
Group Management Services,
Allied Breweries Limited, 126 Station Street,
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Machines: Please specify model.	Applications
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IBM others (specify)	Financial
ICL 1900/2900	Payroll
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Other mainframes (specify)	Database
Other mini-computers (specify)	Message switching
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Languages	Job Titles
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Plan	Systems analyst
Assembler	Systems engineer
PL/I	Analyst/programmer
Fortran	Systems programmer
Filetab	Programmer
RPG11	Operations supervisor
Auto/easy*/user code*	Operator
Others (specify)	Consultant
	Sales representative
	Others (specify)

Operating Systems

DOS	Programmer
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George (specify)	Operator
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Position sought Please state briefly the type of appointment you are seeking.

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You will need at least 2-3 years' successful experience in implementing systems in a commercial environment, ideally including experience of the design of software in collaboration with software programmers. You will be responsible for the definition of system requirements in liaison with user staff at all levels, and for supervising a small team of Systems Analysts designing, specifying and testing the required system.

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THE BENEFITS

The Development Centre for this system is in a pleasant building in Acton, West London, easily accessible by most forms of transport, and has free car parking nearby.

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This could be a very positive step forward in your career. We would welcome a call from you. Make the first move by telephoning Richard Twombles, Systems Manager, Minicomputers, on 01-991 0914, for an exploratory talk; or ask our Recruitment and Selection Officer on Staines (81) 61666, extension 3282 for an application form; alternatively write to him in sufficient detail to make an application form unnecessary at: North Thames Gas, North Thames House, London Road, Staines, Middx. TW18 4AE. Please quote ref. B9108 for the SSA and B9082 for the SA positions.

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IDEC values your experience and the salaries we are offering will fully reflect the importance of your role. Fringe benefits are those to be expected from a successful, progressive organisation and career advancement prospects are excellent.

If you are interested in developing your experience with IDEC, then telephone Mr. P. J. or John Dwyer on 01-300 7788.

Alternatively write with brief career details to: Personnel Department, IDEC, ITC Business Systems, Canada Life House, High Street, Putney, London SW15.

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Salary offered: £5,500.

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Applicants should normally possess a degree or similar qualification but candidates with proven ability and experience would also be considered. The appointment will be on the salary scale £2084-£3504 or £3585-£5155 according to experience.

Further particulars may be obtained from Mrs. P. Vaughan-Smith, The University, Southampton SO9 5NH, to whom applications should be sent by 3rd November, 1978, please quote reference 1026/A/CW.

THE UNIVERSITY OF LANCASTER COMPUTER SERVICES DEPARTMENT APPLICATIONS PROGRAMMER

A vacancy has occurred in the User Services Section for a programmer to develop and advise on Applications Software for users in the North West Universities Network. A degree or equivalent qualification is required and preferably some experience of computing in a research environment, possibly as a user. Salary on the scale £1885-£3555.

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Apply to Nick Willard, Systime Limited, Courses Computer Centre, 432 Dewsbury Road, Leeds LS11 7DF. Tel: Leeds 707411 and 707281.

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Applicants should possess a broad general background in the subjects of Computer Science and preferably have specialised knowledge or research interests in the areas: Communications (Networking and Data Transmission); Real-Time.

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Your RPGII experience is of great value today and tomorrow. System 32/34, ICL 2903/4 are carrying this language into the future.

Our client not only recognises this value but is also able to utilise your experience to provide a challenging working environment where your capabilities will be put to the test and where work is an on-going process of improvement. Whether you have one year or five years' experience a position exists for you, where you will always be important and where you can expect to progress rapidly to project leadership. Salaries up to £7,000, working in and around London, are realistic but the ultimate rewards are far greater.

Ref. W2/1910

£6000 FOR 370 SENIOR PROGRAMMER

HERTS. . . MIDDX.

Our client, keen to retain their competitive edge and not remain stationary because of staff shortages, realises the value of technically skilled professionals and rewards them with both development projects, attractive salaries and training with the latest software products.

If you have three years' programming experience gained on IBM mainframe equipment you will have developed a strong commercial knowledge and become fully conversant in either COBOL, ASSEMBLER and/or PL/1. These skills together with awareness of 370 utilities and a T.P. monitor will enable you to assume the role of senior programmer with the opportunity of team leader responsibility on certain projects.

Various commercial applications are in hand and successful applicants will join a challenging environment where job satisfaction is supplemented by a wide range of benefits including NON-CONTRIBUTORY PENSION SCHEME and MORTGAGE FACILITIES.

Ref. N1/1910

PROGRAMMERS COBOL/PL1

To £6750

HANTS/SURREY

Our client urgently requires three COBOL and/or PL1 Programmers to complement their project teams developing a variety of systems. Successful applicants will have at least two years' programming experience and will be looking to enhance their careers within a well-respected company.

The more senior persons will operate in a team leader capacity on certain projects, covering for the project leader when necessary. All staff are encouraged to contribute with ideas for updating standard procedures which helps to create a convivial and friendly working environment.

The installation is taking delivery of a new mainframe next year and is situated in the attractive stockbroker belt on the Hampshire-Surrey border, easily commutable from the surrounding villages. Relocation expenses are paid, along with additional benefits that combine to provide first-class opportunities.

Ref. S1/1910

24-hour answering service

Please telephone for a confidential discussion or write to:

30 Fleet Street London EC4Y 1AA
01-353 0981.

New IBM 370/138 Installation

North London

★ BIG CAREER BENEFITS

- * "Ground floor" entry to exciting new projects using IBM hardware.
- * Small project team environment with exceptional promotion prospects.
- * Full IBM, database (TOTAL) and Teleprocessing training given - Build your experience!
- * Full VDU development facilities.

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Our Client:

A profitable major manufacturing company and market leaders in their field, with pleasant offices in the North London suburbs.

The Projects:

A series of exciting new marketing, manufacturing and financial systems using TOTAL database and a VDU network. These will be based on a new 370/138 using DOS/VS, full on-line development facilities and a mini communications processor.

To Apply:

You will need at least one of the following:

- 18 months COBOL programming experience on any mainframe.
- Commercial systems experience at any level from junior to project management.
- Assembly experience (DOS/VS, POWER/VS, CICS knowledge an advantage).

To arrange an informal discussion, clip and coupon or telephone Neil Buckingham at Austin Knight Limited, no further writing will be required.

Austin Knight Ltd

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Telephone 01-459 4881

* Systems Project Leader	to £7.8k
* Systems Analyst	to £6.8k
* Cobol Programmers & Analyst Programmers	to £6.0k
* DOS/VS Systems Programmer	to £6.8k

Position applied for

Name _____ Age _____

Address _____

Phone (home) _____ (work) _____

Ref. N1/1910

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Consider first how you can further stretch your abilities to snap up a very big job when you get back. OSCO is the Oil Service Company of Iran, a private consortium of 14 international oil companies engaged in oil and gas exploration for the National Iranian Oil Company.

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No less rewarding are the more immediate material benefits. Initial contracts, of two years duration but with possible extensions, include advantages like single or married accommodation, free medical attention and life insurance for all staff and their families, financial assistance for children's education, generous home leave and a terminal bonus on satisfactory completion of contract. Salaries are paid in U.S. dollars, free of Iranian income tax.

THESE ARE THE PEOPLE WE NEED:

Project Leader - Information Systems

c. U.S. \$33,000 p.a.
Preferably a graduate with at least eight years in commercial programming and systems analysis, including two years' supervisory experience. Specific knowledge should include advanced programming techniques (preferably in Assembler language and PL/I), use of file management systems, on line enquiry systems, advanced database design and data handling techniques, OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/B/C/V.

Project Leaders - Systems Analysts

c. U.S. \$33,000 p.a.
Preferably graduates with a minimum of eight years' experience in commercial programming and systems analysis, and at least two years' supervisory experience. Should also possess a knowledge of advanced programming techniques (preferably in PL/I), use of file management systems, on line enquiry systems, advanced database design and data handling techniques, OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/A/C/V.

tems analysis, and at least two years' supervisory experience. Should also possess a knowledge of advanced programming techniques (preferably in PL/I), use of file management systems, on line enquiry systems, advanced database design (preferably IMS/Mark IV) and data handling techniques OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/A/C/V.

Project Leader - Reservoir Systems

c. U.S. \$33,000 p.a.
Should be a graduate in Petroleum Engineering, Chemical Engineering or related Physical science with emphasis on Mathematics. Will have at least eight years' technical

experience in the development and application of numerical simulation models since obtaining degree. A thorough knowledge of programming in Fortran is required. Ref. 983/C/C/W.

Senior Systems Analyst

c. U.S. \$30,000 p.a.
Preferably a graduate with a minimum of six years in commercial programming and/or systems analysis, preferably with a large industrial organisation. Some supervisory experience is desirable as is specific knowledge of programming techniques (preferably in COBOL, Assembler and PL/I), use of file management systems and on line enquiry systems. Should be familiar with advanced database design and data handling techniques, OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/D/C/W.

Please write with full details of age, qualifications, experience and availability (including appropriate reference number) to:
Frank Wilcockson,
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IRANIAN OIL SERVICES LTD.

PLEASE READ ON...

More than 60 people contacted us in response to our recent advertisement headed "PLEASE READ THIS" and in each case a short telephone call enabled us to determine whether our requirements were compatible.

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Please get in touch with us - you will not be wasting either your time or ours.

For those people who do not recall seeing our last advert we would like to restate some of the things we said:

"We need a lot more staff to achieve the £4,000,000 of growth planned for this year."

"The Service Industry is different and you either love it or hate it. We love it - perhaps you would."

"We have recently been named as the fifth highest wage payer of the top 1,000 private companies in the UK."

"We require computer professionals with a minimum of 2 years' commercial systems and programming experience. At the top end of our scales we are looking for solid consultancy and management experience as well. We have a wide range of salaries (£5,000 to £12,000) because we have a wide range of requirements."

"We offer a wide variety of challenging work from programming through to consultancy. We work with minis and mainframes and with a variety of customers and applications. All promotion is from within and is based purely on ability. Our commitment to growth ensures excellent promotion opportunities. The CMG atmosphere is both professional and informal and everyone is encouraged to participate in the affairs of the company. There are profit-sharing and share-purchase schemes, as well as many excellent non-contributory benefits."

Please write or telephone for more details. If you prefer to call me in the evening or at the weekend you may do so on 01-657 3798.

Pete Startup
Managing Director
CMG (West End) Ltd
Sunley House
Bedford Park
CROYDON CR0 2AP
Tel: 01-686 8251

WEST COUNTRY PROGRAMMERS

ANALYST/PROGRAMMERS

SYSTEMS ANALYSTS/DESIGNERS

are required by a rapidly expanding Software and Consultancy organisation based in Bath.

Assignments are varied and interesting with clients throughout the South West of England.

Applicants must have a sound academic background, with a minimum of two years' relevant experience and show initiative and self-motivation. Salaries are in the range £4K-£8K with a productivity bonus scheme which can increase earnings by up to 10%.

If you are looking for a challenging position situated in a lovely part of the country, please write or phone:

Wetters-Weat Associates Limited
Specialists in Computer Recruitment
Woodlands, Lower Bristol Road, Bath,
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Librarian

The Automobile Association, based at Basingstoke, Hampshire has a vacancy for a Computer Librarian within the Computer Operations Department.

We are looking for a mature person who is capable of running our Computer Media Library. The successful candidate, male or female, will be expected to control a library of 6,500 magnetic tapes by using an automatic tape library system (ATLAS), and 120 disc packs. Additional responsibilities will include file allocation, media evaluation and the supervision of a small team of media librarians.

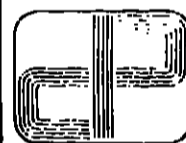
Conditions of employment are in keeping with a progressive organisation.

Please write or telephone for an application form to:



THE AUTOMOBILE ASSOCIATION

Mrs. K. M. Holloway, Head of Personnel, Automobile Association, Fanum House, Basing View,
Basingstoke RG21 2EA Tel: Basingstoke (0256) 62971



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Experienced Computer Operators and Control Clerks

Salary £4,400 (inc. shift allowance)

Due to further expansion - which includes the installation of an ICL 2900 only next year - we require experienced operators and control clerks to join our efficient and hard working Operations Team.

The present configuration consists of two large ICL systems 4/72s, 2B DS60s, 14 MTUs, 4 LPs, 2CR, 30 local VDUs and 4 J.L.I.s.

Identically, applicants should have two years' operating or control experience on System 4 or IBM 360/370 machines. Experience on 2900 - either operating or SCL - would also be an advantage. Three shift working (Monday-Friday) is in operation.

Our office is located very close to the main-line station (London 43 minutes and Brighton 15 minutes).

Applications to:
Alan Merion
Operations Manager
COMPUTER DATA PROCESSING LTD.
Oakfield House
Perrymouth Road
Haywards Heath, Sussex
or telephone Haywards Heath 69188

ipc

ST. BARTHOLOMEW'S HOSPITAL London EC1A 7BE

Programmer

Applications are invited for a programmer to join the Staff of the Medical Electronics Department to work on a variety of applications of microcomputers in a newly re-organised section of Scientific Computing and Statistics. Applicants should be experienced in Fortran programming. Salary scale: £3808 to £4775 inclusive. Please telephone 01-800 8000 ext. 2271-4000 or write to: BCA/271 for an application form and job description.

Systems Designers and Software Engineers

to £6,500 p.a.

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- Your family can enjoy the mild climate, the beaches, the countryside and the New Forest.

We are working on a number of advanced projects for home and overseas markets. Among the most exciting are several in data network switching and control and a computer controlled waste area traffic scheme for the whole city of Sao Paulo in Brazil. These projects utilise the very latest developments in systems technology.

We are offering first class career opportunities to: Group Leaders, Principal Engineers and Programmers with a background in any of the following:
DEC, PDP11, RSX 11M, Coral Assembler or Fortran.

If you cannot make any of the above visits, please write at once or telephone Richard Edwards, Technical Recruitment Officer, Plessey Controls Limited, Sopers Lane, Poole, Dorset BH17 7JR. Tel: Poole (02043) 5161 Ext. 2544

Come and talk...
in a very informal setting to some of our engineers and personnel people. We will tell you all about our work and opportunities and all the benefits we can offer you. You will find us between 4pm and 9pm at the following sites:

THE SAXON HOTEL
Southern Way, Harlow
on 24th October

THE CROMWELL HOTEL
High Street, Stevenage (Old Town)
on 25th October

CIVIC OFFICE
The Bute Centre, Reading
on 26th October

PLESSEY

Bored?

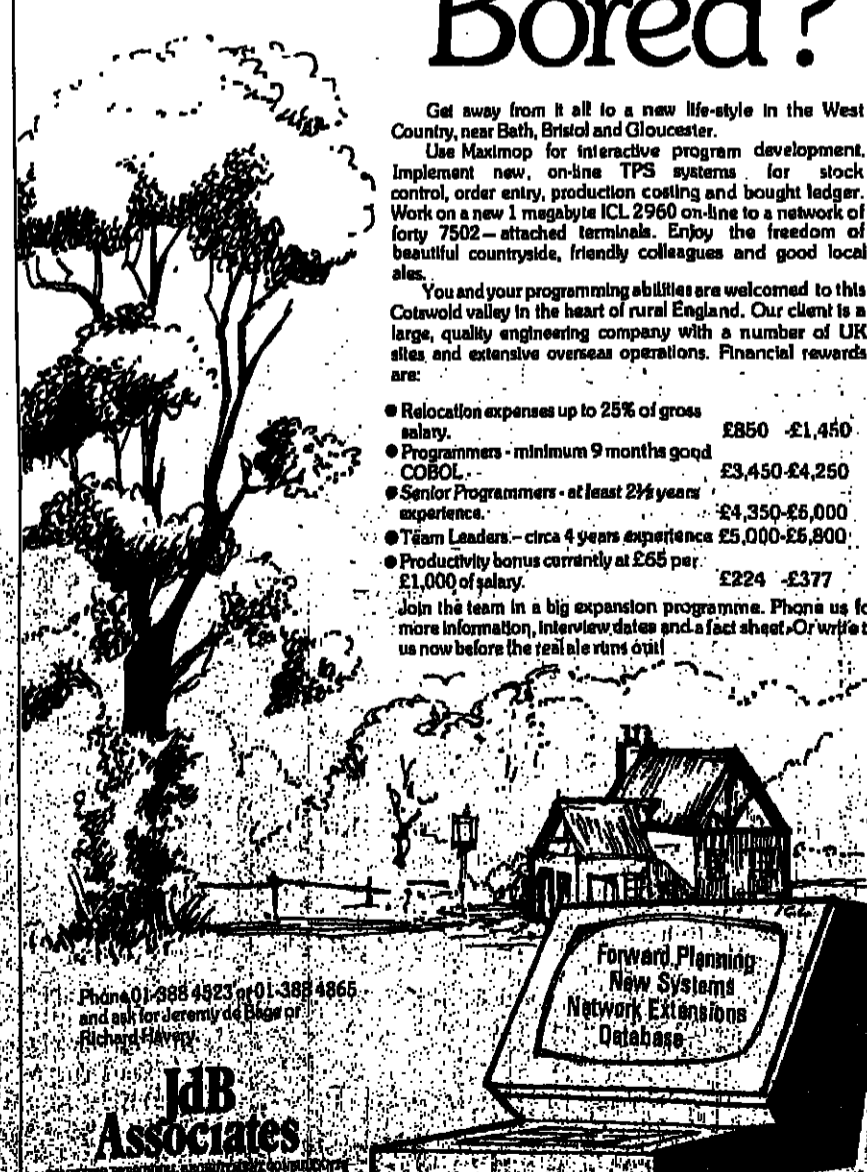
Get away from it all to a new life-style in the West Country, near Bath, Bristol and Gloucester.

Use Maximop for interactive program development. Implement new, on-line TPS systems for stock control, order entry, production costing and bought ledger. Work on a new 1 megabyte ICL 2960 on-line to a network of forty 7502 - attached terminals. Enjoy the freedom of beautiful countryside, friendly colleagues and good local ales.

You and your programming abilities are welcomed to this Cotswold valley in the heart of rural England. Our client is a large, quality engineering company with a number of UK sites and extensive overseas operations. Financial rewards are:

- Relocation expenses up to 25% of gross salary. £850 - £1,450
- Programmers - minimum 9 months good COBOL. £3,450-£4,250
- Senior Programmers - at least 2 1/2 years experience. £4,350-£5,000
- Team Leaders - circa 4 years experience £5,000-£5,800
- Productivity bonus currently at £65 per £1,000 of salary. £224 - £377

Join the team in a big expansion programme. Phone us for more information, interview dates and a fact sheet. Or write to us now before the train leaves the rails.



Phone 01-388 4825 or 01-388 4865 and ask for Jeremy de Bage or Richard Harvey

JB Associates

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Acting for clients we seek junior and senior Field Service Engineers for the following vacancies:

- MIDDLE EAST. ACCOMPANIED £10,000 tax-free + good fringe package. PDP 11/40 experience essential.
- MIDLANDS. £5,500 + car + bonus.
- HERTS./BERKS. £4,500-£7,200 + car.
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Ring us regardless of experience.

EDP SYSTEMS 01.637 52-53 Margaret St. London W1N 7FF 5796



LEIGH

Another 15 Operations Professionals have joined us

As a result of our recent advertisements and they are now key members of our team.

THEIR WORKING CONDITIONS

- are second to none, as you would expect in a multi-million pound data centre, one of the most advanced computer technology centres in the world.

THEIR CAREER PROSPECTS

- are unrivalled as our philosophy is that computer operating provides the grounding for many career opportunities within D.P. at BL Cars.

And when you consider the equipment: 1x3033, 1x370/168, 2x370/168 and 2x370/145 and our internal and external training schemes, need we say more.

THEIR BENEFITS

- are those you would expect of a major company and include 5 weeks holiday, pension, life assurance and sick pay schemes and substantial discount on BL cars and accessories. Plus generous relocation assistance as necessary to this pleasant rural area, where housing is favourably priced.

But we still need more ambitious men and women, so why not join them.

Right now we're looking for:

Network Operators • Senior Computer Operators • Computer Operators

Ideally with experience in at least 3 of the following:
VM, DOS/VS, VS11, HASP, MVS, TSO, IMS or CICS. But more important, you should have a genuine interest in computing as a career.

So, if you're looking to be part of a successful team, using the finest equipment available, ring Rod Watts on Redditch (0527) 28515 or alternatively write for an application form to:

Operations Manager, BL Cars Limited, Data Centre, PO Box 5, Redditch, Worcs.



Cars Staffs & Services



CAREERS WITH A DIFFERENCE WITH HUGH SYMONS

REALISE YOUR AMBITIONS IN BEAUTIFUL WILTSHIRE

Snr. Analyst/Programmer

Required by progressive and expanding wholesale company to lead a small programming team.

This is YOUR opportunity to grow with a company poised for European expansion. Successful applicants should have sound commercial background and be capable of developing to a position where he/she can deputise for the DPM in his absence.

Present hardware is a 64K IBM Sys. 3/15 80MB disc with planned upgrade in December. Further improvements are likely in line with company growth. Applications include offline sales ledger for associate company in France, with many basic applications to be added to the UK operation.

Career prospects are sound. Working environment is excellent, situated in countryside 7 miles from BATH. Salary up to £5750.

THIS POST IS AVAILABLE NOW
Above is just ONE example of a HUGH SYMONS CAREER

Now what do you look for in a career? Number the following in order of preference.

- 1 PROGRESSIVE SALARY ☐
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- 3 LOCATION ☐
- 4 APPRECIATION OF YOUR EFFORTS ☐
- 5 PROGRESSIVE DP ENVIRONMENT ☐
- 6 NEW CHALLENGE ☐
- 7 GOOD WORKING CONDITIONS ☐
- 8 RESPONSIBILITY ☐
- 9 PROMOTION ☐
- 10 FRINGE BENEFITS ☐

Register with us by clipping your entry to our competition before November 3rd and win a cash prize if you are considering a move up to a career or want to be kept informed of jobs that match your requirements.

NAME _____ PRESENT JOB TITLE _____
ADDRESS _____

Please send me your application form and register my entry

HUGH SYMONS MANAGEMENT SERVICES
35 PARK STREET, BRISTOL BS1 5NH
Tel: 0272 294196

A member of the HUGH SYMONS GROUP of Companies

Data Base Administrator

Salary £7329-£8073 p.a. inc. + car allowance

The Boroughs of Ealing and Brent are developing an on-line Data Base to provide information on all aspects of property within the boroughs.

It is policy to exploit the large quantity of information on land and property already collected, in order to improve management in all departments of both Authorities that deal with property matters.

The project is being developed as a major part of overall computing strategy.

The Data Base Administrator will be responsible for controlling the use of Data Base, and managing new Data Base applications from inception through to implementation.

He or she will lead a small design and programming team and report at top management level. The team has data processing support. The central files of the Property Data Base are already operational on the joint installations IBM370/145. The Data Base Project makes use of PL/I, GIS, CICS, and on-line development facilities.

The administrator will require the experience to direct a demanding project and the ability to communicate effectively at all levels. Local Authority experience will be an asset but is not essential. A degree or equivalent qualification is required.

The post is based at Ealing Town Hall, 35-hour flexible working week, staff restaurant, interest free loans for season tickets, assistance with re-location expenses and superannuation scheme.

For an informal discussion please ring Mr. R. Wayne, Computer Manager, 01-992 5566 Ext. 3201.

For further details and application form from Personnel Office, Room A202, Town Hall Annex, London W5 2BY. Tel. 01-579 2424 Ext. 3350.

Closing date for applications is 16th October and interviews are provisionally arranged for 26th October. Please quote ref. no. 151 TC.



ARE YOU A FRUSTRATED COMPUTER OPERATOR?

A leading company in the phototypesetting industry has a vacancy for a person to run a new department handling all aspects of our computerised typesetting and records system. The job also involves close liaison with our programmers in the handling of software modifications for a person with interest in machine code programming of Mini Microprocessors there is real scope for career development.

Salary negotiable. 4 weeks' holiday, pension and sick pay scheme.

Phone or write for application form to:
Mr. Bus
Data Systems Ltd
840 Harrow Road
Wembley, Middx
01-904 0061

METROPOLITAN BOROUGH OF TRAFFORD BOROUGH TREASURER'S DEPARTMENT SYSTEMS PROGRAMMER PO1 (2-6)

Applications are invited from keen and experienced persons. The successful candidate will be expected to install, maintain and tune the following software: DOS/VS, VM/370, CMS, CICS/VS, POWER/VS and the database package RAMIS DOS. Experience of any of these products whilst not essential would be advantageous. The essential qualification is a keen interest in systems programming together with the skill to maintain the systems throughout an ambitious and expanding programme of development of inter-active systems.

The Council will shortly take delivery of a one megabyte 370/138 operating under VM/370 and DOS/VS. It is also intended to develop the RAMIS database applications.

Application forms and further information from Miss S. Dawson, (Tel: 061-950 0161 ext. 242). Completed forms should be returned to the Borough Treasurer, P.O. Box 16, Warburton House, 39/47 Washway Road, Sale M33 1AL by 3rd November.

OPERATORS

Complete the coupon and return to the address below, for your next PERMANENT or CONTRACT job.

Name (in full) _____

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Position Required _____ Salary/Rate _____

Notice Required/Date Available (delete) _____

Areas Preferred First Choice _____ Second Choice _____

Experience to date: (Last Position First)

Company Name	From	To	Hardware	Operating Systems/Software
	Mth/Year	Mth/Year		

EFFECTIA GRAVIS
NATIONAL HOUSE, 66 WARDOUR STREET
LONDON W1V 3HP. 01-439 6481 (24 hours)

Project Leader

SUSSEX TO £6500

Our clients require a dynamic and enthusiastic engineer with computer experience to develop and lead the activities of a small team propagating the use of computer aids and techniques for design and manufacture. Applicants must be graduates in Mechanical or Chemical Engineering. Supervisory experience. FORTRAN programming and use of graphics will be preferred. The department provides an R & D service to a large and diverse group.

Consultant: Don Walklate

Cobol Programmer

BIRMINGHAM UP TO £5200

An engineering group with a Honeywell Level 62 computer, urgently require an experienced COBOL Programmer, any machine accepted, to assist in developing and maintaining a wide variety of systems. Candidates must be well motivated and be accustomed to providing a high standard of support documentation. The casual involvement in system development will also be available if required. Current applications include Sales Order Processing, Analysis, Purchase Ledgers and Payroll. A small team handles all development and maintenance with external Turkeys assistance for any major development work. Generous staff benefits are offered in addition to competitive salary.

Consultant: Don Philp, telephone 021-454 7906.

Turnkey Systems — Systems Development Manager

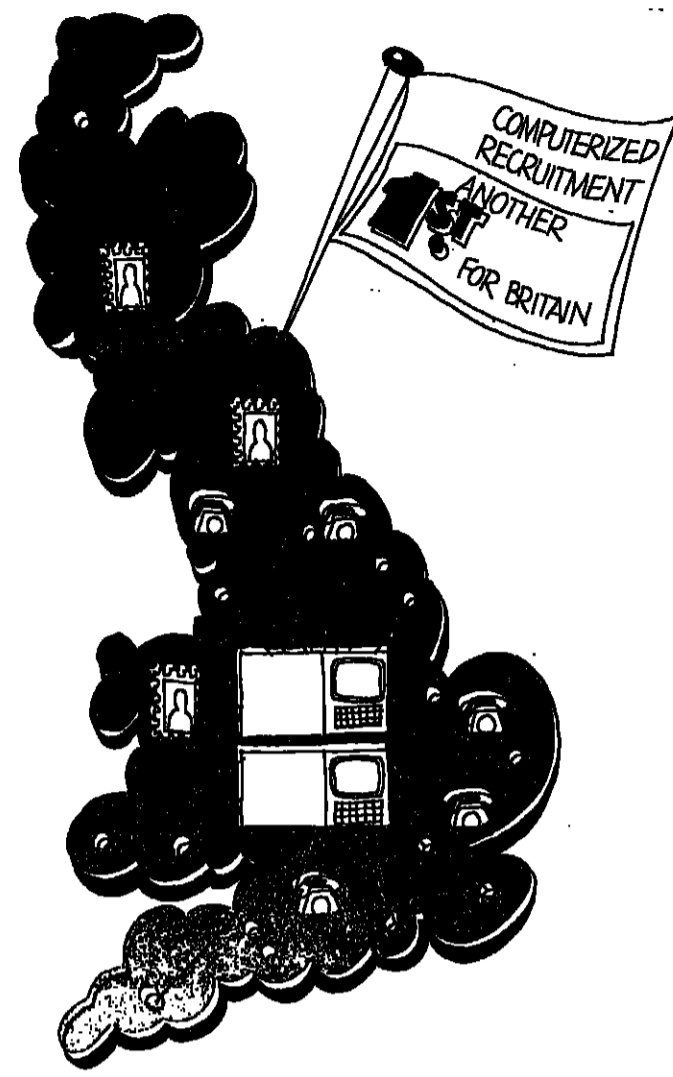
NEG + BONUS

S.M.C. has embarked upon a further stage of development with the launching of a sophisticated new Data Centre based in Birmingham and handling U.K. Turnkey Systems Development. We now require a Senior Systems Manager capable of guiding and directing Analysts in feasibility studies with prospective clients in the context of their requirements and defining initial stages. Equally, a competent knowledge of systems programming and operating systems is sought. The successful candidate will be responsible for the overall planning and control. Ability to motivate and lead a team of analysts and programmers is essential. The position requires a high level of initiative and judgement. Ability to present a positive business case to clients at Board level will be important as will the confidence to address a user group of between 50 and 250 delegates at national conventions.

The successful manager will play a major role in the development of our Turnkey Systems Division and must be prepared to accept the pressures and responsibilities commensurate with a high growth sector, in order to progress to the ultimate career opportunities within the company. A bonus scheme is in operation for senior management throughout the group and applied on individual and performance. The position represents the opportunity of joining a new division and making an early impact upon management. Experience within a consultancy or Turnkey company would be advantageous. Age 30 to 40 preferred. Relocation assistance where appropriate. Apply initially to J. L. Wood, Managing Director, and return the attached form to the Birmingham office.

CONTRACT

- LONDON & SOUTH** £175-£250
Cobol/Plan Progs, City, 6 months
Honeywell Cobol, Surrey
Honeywell Cobol, Middle
Honeywell Cobol, Herts
Honeywell Cobol, Central
Analysts — 2900 Series, City
Analysts — 2900 Series, Acton, Upton
- NORTH** £150-£225
Honeywell Analysts, N.W.
Honeywell Progs, Cobol, NW
Honeywell, Cobol, IDS/TDS, NW
Honeywell, Cobol, Yorks and Leeds
IBM Cobol, Various
Fortran and Assembler, North West
- EUROPE — GERMANY**
IBM — Analysts, Herts
IBM Progs — 750, Herts
ICL Cobol, Herts
Fortran, Various
IDA — (M9) Progs
- HOLLAND — SWITZERLAND**
Fortran — Univas
PDP — Assembler
Pascal
IDA — (M9) Progs
- MIDLANDS** £150-£225
IBM Cobol
ICL Cobol
Honeywell Cobol/IDS/TDS
IBM Progs, Various



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We can cross-match the entire industry of 100,000 Analysts & Programmers the same day against suitable vacancies in your area or throughout the U.K. Why take a limited choice? Use E.M.S. — the professionals' company.

D.P. Manager Designate

THAMES VALLEY UP TO £7000

Our client, who has recently ordered an IBM System 3 Model 15 and a remote System 34, is looking for a highly professional Analyst/Programmer with the potential and drive to become the company's Data Processing Manager in approximately 2 years' time.

The successful applicant for this challenging and rewarding position will have a proven record of successful project implementation and 2 years' experience of programming in RPG II. He or she will initially play the major role in implementing an extremely sophisticated order processing and inventory control system, with equally challenging and interesting new developments planned for the future.

The position reports directly to the European Data Processing Manager and is based in rural surroundings in the heart of the Thames Valley, but there will be a future requirement for some European travel.

Our client is offering an exceptionally attractive benefits package in addition to a starting salary of up to £7,000 per annum to the successful applicant who has his or her long-term career in mind.

If you are interested in this first-class opportunity, please complete and return the attached application form quoting DP/TV or ring DON PHILP on 021-454 7906.

Analysts

NORTH WEST Packages to £7500 + O/T pay

The E.M.S. consulting group has a large quantity of vacancies for additional Analysts to handle expanding systems requirements in the North West region. Candidates should have a minimum of 2 years' systems experience and preferably, although not essential, oral programming experience. Our major current requirements are for both Analysts and Senior Analysts to work on commercial systems development projects including: Ledger Systems, Stock Control, Warehousing and Distribution, Chain Store Systems, Database and Network Systems. Ability to work with client team members and maintain a high professional standard will be important. Relocation assistance will be paid where appropriate. Telephone our Birmingham Data Centre for early interviews on 021-454 7906 (Home 021-454 7906). Please complete the attached application form in addition and return to Newcastle, Staffs., today. Over 20 current vacancies are available at very attractive salary levels.

Analysts & Programmers

BIRMINGHAM THROUGHOUT

We currently have a large volume of vacancies throughout the Birmingham and West Midlands regions, including a wide variety of new jobs in the rapidly expanding E.M.S. Data Centre. COBOL and ASSEMBLER programmers should complete our application forms today as an urgent priority. We have an unparalleled range of vacancies available, in addition to hundreds of client vacancies. E.M.S. also has interesting and challenging vacancies within our constantly working on new development projects within a modern, attractively furnished Data Centre. Interviews will be held daily at the Data Centre — Why not come along to discuss your career development prospects within the Midlands? E.M.S. — as the largest recruitment consultancy in the country, has opportunities available for all D.P. staff which are unrivalled throughout the Midlands. Equally, those do not hesitate to complete and return today the attached application form. For only a few minutes initial correspondence the lucrative career opportunities will be forthcoming for you to make your time worth the investment.

Top Salesmen and Sales Manager

10K-20K (and it is earnable!)

E.M.S. is planning substantial further development of both our Consultants and Turnkey Systems Divisions during the coming months. Our consultancy activities extend across all mainframe ranges and encompass a wide range of industrial/commercial organisations. Applicants must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or quantifying the relevant consulting experience required in either systems or programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resources support. Equally, our Turnkey Systems Division provides total U.K. coverage, marketing Honeywell Level 8 mini-computer systems and supporting software to a wide range of clients. Experienced Salesmen capable of developing their own territories are urgently required. A substantial quantity of leads are also supplied by extensive and vigorous advertising campaigns and Road Show ventures. Salesmen must possess an adequate mini-computer knowledge for Turnkey Systems positions. Cars will be provided with adequate base salary and high prospective incentives. Apply by telephone for interview during the next week at our Birmingham Data Centre. All U.K. territories will be controlled from the pending regional development of other Centres. Consultant: John Wood.

ICL Programmers

BEDS. UP TO £5500

Up to 12 additional staff are required with 1 to 2 years' programming experience on ICL 2901/2904 or small 1800s in a commercial environment using RPG II. Successful candidates must be able to read and understand working knowledge of Univas, ICL and DDE's. On-line experience useful but not necessary. Duties will include programming, testing, documentation, sales and maintenance. Further training will be provided as a means to ensuring continued success and career progression. Consultant: Carol Proudman.

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Experienced Analysts are required to work on designs, implementations and maintenance projects with a large engineering group. Commercial applications experience is required including Accounting, BOM/P and implementation of a new major system. A minimum of 5 years' DP experience is sought. Relocation expense would be paid where appropriate. Consultant: Don Philp.

Systems Engineers

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A leading supplier of mini-computer equipment is currently seeking Systems Engineers to support clients in both pre and post sales environments. Successful candidates will probably have been educated to degree level and have experience in real-time systems on mini-computers, assembler level programming and have a theoretical knowledge of systems solvers, i.e. operating systems, database, data communications. If you are interested in a position which demands a high level of individual responsibility and self-motivation, please complete and return the attached application form or telephone Carol Proudman on 0782 023885.

Analysts

HERTS. UP TO £7200

One of Britain's largest trading groups has a large quantity of outstanding systems analyst vacancies to cope with substantial expansion plans being developed. The client requires candidates to have an IBM background preferably with some programming experience. In addition any IMS or COMBOL knowledge would be especially valued. Excellent working conditions are available with interesting and absorbing projects and good career development opportunities, business applications and a wide range of interesting new products. Relocation assistance will be provided where appropriate. Consultant: Don Philp, telephone 021-454 7906.

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Britain's first IBM Series 30 site has a large number of outstanding vacancies in numerous interesting new development projects. Experienced IBM Programmers are urgently sought to work on large, critical loans. Any IMS, TSO experience would be especially valuable. Otherwise, general OS/COBOL will be acceptable. Relocation assistance provided. Consultant: Don Philp, telephone 021-454 7906.



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A good background in DOS/VS, CICS, GRASP and TP/Database, with Assembler knowledge. IBM 370/138 hardware. Travel involved. London W.C.2. Ref: 320

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Metropolitan Borough of Rochdale

Treasurer's Department
PROGRAMMER (Computer Section)
AP/A/5 44245 / E5073

Rochdale is situated 12 miles north of Manchester on the edge of open moorland.

An I.C.L. 2980 system has recently been delivered and the machine and staff are housed in purpose designed accommodation in new municipal offices.

The successful candidate will be one of a team of five programmers engaged in continuing development and maintenance work and the preparation of existing work for the 2980 installation. Knowledge of Cobol Plan and Communications systems will be an added advantage.

Assistance with removal expenses and housing accommodation may be available in appropriate cases. Further details may be obtained by ringing Rochdale 99308 (Mr. Wright).

Application forms available (by quoting Ref. No. C84) from the Chief Personnel Officer, 188 Drake Street, Rochdale OL16 1XG, to whom they should be returned by 2nd November, 1978.

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ICL 1900 & New Range
Thames Valley & London
£5.5-8,000
(Ref:30/D)

A London based client with regional offices in several Home Counties locations has retained Logistix to aid in recruiting up to 12 Mini or Micro computer specialists with 18 months or more practical applications or software development experience in either computer manufacturing or Software Systems House environment. If you have relevant experience we invite you to discuss your career advancement prospects with our client at your earliest convenience in an informal atmosphere.

Those who have Assembler or Basic language experience on Mini or Micro hardware particularly DEC PDP 11, D.G. Nova/Eclipse & T.I. 900/9900 or Micro processors preferably Intel 8080/5, Zilog Z80 or Motorola 6800 will be ideally suited. In addition to above-market starting salaries our client offers excellent career advancement prospects and the opportunity to travel within Western Europe. We would like to hear from interested applicants as soon as possible with a view to arranging an early interview. Salaries will be in the range £6-8,500.

A very prestige client with Headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-time & On-Line programmers & Systems Designers, Database & Compiler specialists with 2-5 years solid experience. Of particular interest would be people with relevant experience in one or more of the following: DEC with either BASIC, RTL, II or CORAL, IBM or ICL with COBOL, Assembler or PL/I. Also Ferranti Argus or IMS or Database design specialities are welcome. The scope of projects is both broad and demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and will be given considerable autonomy in developing your technical expertise and enhancing your contribution to the work of this reputable group of which you will be more than proud to be a member. Logistix have been given a brief to pre-select suitable personnel and to recommend Salary grades in line with our experience of prevailing market levels. We anticipate Salaries of between £5 and 7K being accepted. Of importance is a speedy response as our clients are anxious to make offers of appointment.

An international client with offices in London and Europe is entering another major expansion phase for which they require additional line expertise including Project Leaders, Systems Designers, Analysts and Senior Programmers; the latter should be skilled in either PL/I, COBOL, Assembler or Mark IV. Both Database and Data Communications experience would be welcome. Applications are varied but include Banking systems, Airline booking and Stock control. Not less than two years relevant experience will be considered and for more senior positions 4 years is the minimum. U.K. based personnel may have frequent opportunity to travel to Europe and the U.S. (if desired). Europe based personnel are given very generous expenses and tax, and not paid trips back to the U.K. Salaries needlessly to say are going to be well above the norm in keeping with the client's prestige and the importance which they place on the acquisition of these key personnel. We have our Client's assurance that interviews will be held without delay as soon as resumes are received. You will be interviewed either in London or flown out for the day to Amsterdam or Frankfurt.

An important client of International repute with offices in the Thames Valley & London requires, due to further growth, the following permanent or long contract personnel: Consultants, Analysts, Systems Designers & Programmers to join new and existing project teams for work on a variety of commercial systems involving T.P. and Database expertise. Prior experience of the former is desirable but not essential. Of significant importance is solid grounding in one or hopefully more ICL programming languages or On-Line skills. Successful candidates will have either New Range or 2900 Main-frame or 1900 hardware backgrounds under either DME, VME or GEORGE. Conversion 1900-2900 experience would be especially welcome as would be any Communications background. In addition to very competitive salaries full relocation expenses are provided, if applicable, and an impressive package of fringe benefits accompany these offers. Interviews will be held as soon as applications are received and offers made to successful candidates within 7 days. All interview expenses will, of course, be Client paid.

Database designers and applications programmers with either IMS, TOTAL, ADABAS etc to be based in Europe or West of London. Salary £8-16K plus big company benefits.

Oil Company based in Central London urgently requires IMS DB/DC Analysts, Database designers & Applications programmers. Salaries dependant on grade £8-12K.

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PDP-11 Specialists - one of the principal OEM suppliers of DEC systems based in the Thames Valley are offering senior RSX-11M or RSTS personnel exiting career opportunities at very tempting salaries up to 10K.

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Hardware Engineers (Minis) with a desire to work on long term contract in Germany or France at circa £400 p.w. (tax free). A pre-requisite is experience of 32 or 16 bit minis or Wang/CDC type disk drives.

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in the Department of Electrical Engineering Science

Applications are invited for a post of Temporary Lecturer (salary scale £3,893-£7,754) in the above Department for appointment not less than 1 December, 1978. Candidates should have a relevant degree and experience in telecommunications or computer systems, with special interest in software engineering or telecommunications software.

Applications (three copies), including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AG/61/DW), University of Essex, Wivenhoe Park, Colchester CO4 3SD, from whom further particulars may be obtained by November 2nd, 1978.

Zimmer
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The position involves basic plus programming working on a Digital P.D.P. 11/40 computer.

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Friday 27th October 6pm to 10pm
Saturday 28th October 9am to 1pm

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You will be responsible for final test, debug and verification of Amdahl computer systems. The performance of these tasks involves the use and full knowledge of large scale data processing systems and high speed measurement techniques. Your background should include experience with final test or field maintenance of medium or large scale computers or S/370 compatible peripheral controllers. College graduates with electrical engineering qualifications emphasizing digital logic design are encouraged to apply.

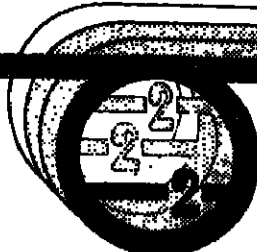
PLANT ENGINEER

You will be responsible for the organisation and direction of maintenance, construction and utility services to the plant. This involves preparation of capital order requests for major equipment, co-ordination of the construction of the proposed new manufacturing facility and the introduction of planned preventative maintenance systems. Your background should include at least 5 years plant/facilities engineering in a manufacturing environment and a degree or equivalent qualification in mechanical or electrical engineering.

Salaries and conditions of employment for these positions will be attractive. Assistance with relocation expenses will be payable. Applications in writing or telephone for Application Form to:

**The Personnel Director,
Amdahl Ireland Limited,
140/141 Slaney Close,
Dublin Industrial Estate,
Dublin 11.
Telephone (01) 307966**

Training for these positions will be carried out at the Amdahl headquarters at Sunnyvale, California.



KBS Computer Services
155 Old Kent Road, London SE1 5UT

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This IBM 370 twin processor installation requires Team Leaders to control groups of 3-8 programmers. An IBM or Honeywell background would be ideal, as

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Australia £12,000 and £9,000

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The Senior Systems Analyst is to act as a Project Leader and should have at least five years system design/analysis experience. Those with experience of financial and production applications will have an advantage. Age around 25/35. Salary A\$20,000 pa.

The Analyst/Programmer is to be a member of a project team and initially will be the Senior Programmer. Two years' experience of COBOL is essential. FORTRAN is desirable. Age around 22/28. Salary A\$16,000 pa.

In addition to the salaries mentioned above, the total remuneration package includes relocation costs to Australia for applicants and their families. Preliminary interviews are to be held in UK from about 13 November and final interviews in London from 20 November 1978.

Candidates, male or female, should write for a personal history form and further details, quoting reference MCS/5020 (Senior Systems Analyst) or MCS/5021 (Analyst/Programmer), to Roland Orr, Executive Selection Division, Southwark Towers, 32 London Bridge Street, London SE1 9SY.

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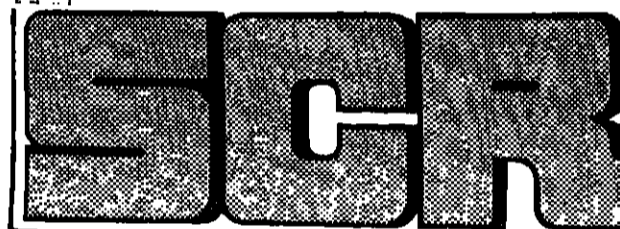
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SHEFFIELD

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The successful applicant will be expected to:

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To be responsible for the development of new computer programmes plus the maintenance and enhancement of existing systems.

It will involve the analysis of user requirements for small projects and candidates should have three years' COBOL programming experience together with experience on IBM 360 or 370.

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To work with Remote Batch Terminals connected to San Francisco computers and UK computer bureaux. Appropriate training will be provided.

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An experienced operator is required for an IBM 370/145 installation. Applicants should have a good working knowledge of DOS or DOS/VS coupled with the ability to communicate effectively and to solve operational problems. The successful candidate will work on a two shift basis taking on above average level of responsibility for the efficient running of the installation. Benefits include paid overtime, 18 days' holiday, interest-free loans for season tickets.

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Salary to £6,250

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Further information from and applications to:
Alan Barker
CAPABILITY SERVICES
11 Coggeshall Road, Braintree, Essex
Telephone: Braintree 26826

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WEMBLEY PL/I Progs., to £6500
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ST. ALBANS Anal./Prog. £5800 or graduate Trainee, £3300
WELWYN S.A. IBM background, to £7000
COBOL Progs. to £5400
Syst/Prog. to £6000

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Applications should be addressed to



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MIDDLESEX c £6000 + Car

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Application Forms are obtainable by telephoning Bristol (0272) 648236 or by writing to the Personnel Manager. They should be completed and returned to him quoting Vacancy Notice Number 75/78/CW by not later than 3 November, 1978.

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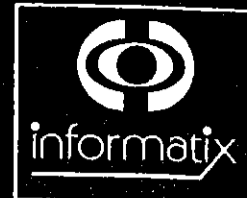
Please write with brief career details, including qualifications, age and present salary to B.R. Allen, Mobil Shipping Company Limited, 54/60 Victoria Street, London, SW1E 6QB

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
PROGRAMMERS	To £5,400 + bonus ++	BANKING	E. LONDON	IBM DOS	Opportunities for programmers with 18 mths + experience (preferably PL/1) to work on the development of advanced systems using CICS & Mins.	42/1
ST/ANALYSTS	To £15,000	SOFTWARE SERVICES	HOLLAND	MINIS/MICROS	Excellent opportunities for D.P. professionals with in-depth experience of Mini/Micro software or on-line, real-time or message switching to work on exciting projects.	42/2
PROGRAMMERS/ANALYSTS	To £8,000 + Marg. sub.	FINANCIAL ORGANISATION	HERTS.	IBM	Programmers with 2 yrs. + COBOL. Assembler or PL/1 urgently required to join this expanding D.P. department using on-line facilities with CICS.	42/3
CUSTOMER SUPPORT ANALYSTS	To £8,000 +	MANUFACTURER	LONDON	MINIS/VRC's	Unusual opportunities for programmers with a Mini/VRC background and commercial experience to be involved in design/installation and support of clients' systems.	42/4
PROJECT LEADERS/ANALYSTS/PROGRAMMERS	c £7,500	SOFTWARE HOUSE/BUREAU	BERKS.	ANY	Excellent prospects for all levels of staff with a general commercial background and preferably assembler level programming to join this new division of a well established organisation.	42/5
RPG II/COBOL PROGRAMMERS	To £6,500	CONSTRUCTION INDUSTRY	S.W. LONDON	IBM DOS/VS	Unusual applications await programmers with 2 yrs. + COBOL or RPG II to work on engineering projects in this rapidly expanding organisation.	42/6
TECHNICAL/SCIENTIFIC PROGRAMMERS	To £7,000 +	TECHNICAL CONSULTANCY	LONDON + S.E.	MINIS/MICROS	Varied and exciting development projects available for scientific programmers with 2 yrs. + Assembler/Fortran/Coral experience.	42/7
CONSULTANT ANALYST/PROGRAMMERS	A.1 exp.	SOFTWARE HOUSE	GERMANY	IBM OS	One year contracts available for D.P. professionals with in-depth knowledge of OS software and Assembler/PL/1 or SPL for challenging development projects.	42/8
TECHNICAL SUPPORT STAFF	To £5,500 + bonus + car	MANUFACTURER	LONDON + TRAVEL	ANY	Excellent opportunities for Analyst/Programmers with 2 yrs. + experience in R/T, Comms/Banking/Accounting to evaluate and develop applications and systems in an expanding environment.	42/9
PROGRAMMERS	To £7,000	FINANCIAL SERVICES	CITY	IBM OS	Excellent career opportunities for PL/1/Assembler programmers with 2 yrs. + experience to work on a wide variety of projects in a real-time/TP environment.	42/10
SOFTWARE DESIGNERS	To £9,000	MANUFACTURER	BERKS	ANY	Exceptional opportunities for experienced software staff in the fields of comms. O/S, assemblers, etc. to work on the development through to implementation of products.	42/11
SYSTEMS/DEVELOPMENT PROGRAMMERS	To £8,000 in UK	SERVICE INDUSTRY	LONDON/HOME COUNTIES BENELUX	IBM DOS	IBM DOS ASSEMBLER programmers urgently required to work in a challenging and rewarding developing/maintaining software products.	42/12
SYSTEMS ANALYSTS	To £7,500	SOFTWARE HOUSE	W.C.1	MAINFRAME/MINIS	This progressive Software House urgently requires Analysts with a minimum of 1 yr. + experience to work on various commercial applications.	42/13
ANALYSTS & PROGRAMMERS	To £10,000 TAX FREE + ACCOM.	BUREAU	SAUDI ARABIA	IBM DOS	Analysts with DB/TP experience and programmers with COBOL urgently required for 1 yr. renewable contracts. Interviews will be arranged in London.	42/14
PROGRAMMERS	To £5,500	PROFESSIONAL SERVICES	S.E. LONDON	PDP 11's RSTS	Programmers with 1 yr. + experience of BASIC + to work on development projects in an on-line environment urgently required. Opportunities to work on Micro and word processing systems.	42/15
ANALYSTS/PROGRAMMERS	To £7,500 + bonus	INSURANCE/FINANCE	CITY	IBM OS	Analyst/Programmers required preferably with a PL/1 background to join this expanding organisation using IMS, CICS, to maintain and enhance production systems.	42/16
BANKING CONSULTANCY	A.1 exp.	BUSINESS SERVICES	E.E.C.	ANY	Unusual and challenging 1 yr. renewable contract for high flying consultant with banking experience. Excellent prospects for the right candidate.	42/17
PROJECT LEADERS	c £7,000 +	CHEMICAL INDUSTRY	MIDDX.	IBM OS	First-class opportunities for commercial analysts with 3 yrs. + experience and knowledge of COBOL to develop new systems in an on-line database environment.	42/18
CAD/CAM SPECIALISTS	c £9,000 (Holland)	GRAPHICS INDUSTRY	HERTS/HOLLAND	ANY	Professional D.P. staff with in-depth experience of CAD/CAM required to join expanding organisations in the graphics industry. Excellent career prospects.	42/19
PROGRAMMERS	To £5,200	MATERIALS SUPPLIERS	MIDDX.	ICL 1800	Excellent opportunities for programmer with 1 yr. + COBOL experience to develop a variety of applications in a database environment.	42/20
SENIOR CONSULTANTS	To £10,000 +	CONSULTANCY SERVICES	LONDON & S.E.	ANY	Opportunities for D.P. professionals. Preferably with previous consultancy and management experience to join an expanding consultancy organisation.	42/21
ANALYSTS/COBOL PROGRAMMERS	To £7,000	MANUFACTURING	HERTS	IBM	Excellent career opportunities for ambitious D.P. professionals capable of working in a challenging environment.	42/22
ANALYSTS/CONSULTANTS	c £7,000 +	CONSULTANCY SERVICES	LONDON	ANY	First-class opportunities for Analysts who have developed and implemented financial systems in low cost well established international organisations.	42/23

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